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De Brame's Revolving Cannon.

In connection with our illustration of this invention, we publish the description which the inventor gave to the Polytechnic Association, with the discussion of its merits that ensued.

[Reported for the Scientific American.]

The Polytechnic Association of the American Institute held its usual weekly meeting at their rooms in the Cooper Building, on Thursday evening, June 6, 1861 ; Prof. Mason in the chair.

DE BRAME'S REVOLVING CANNON.

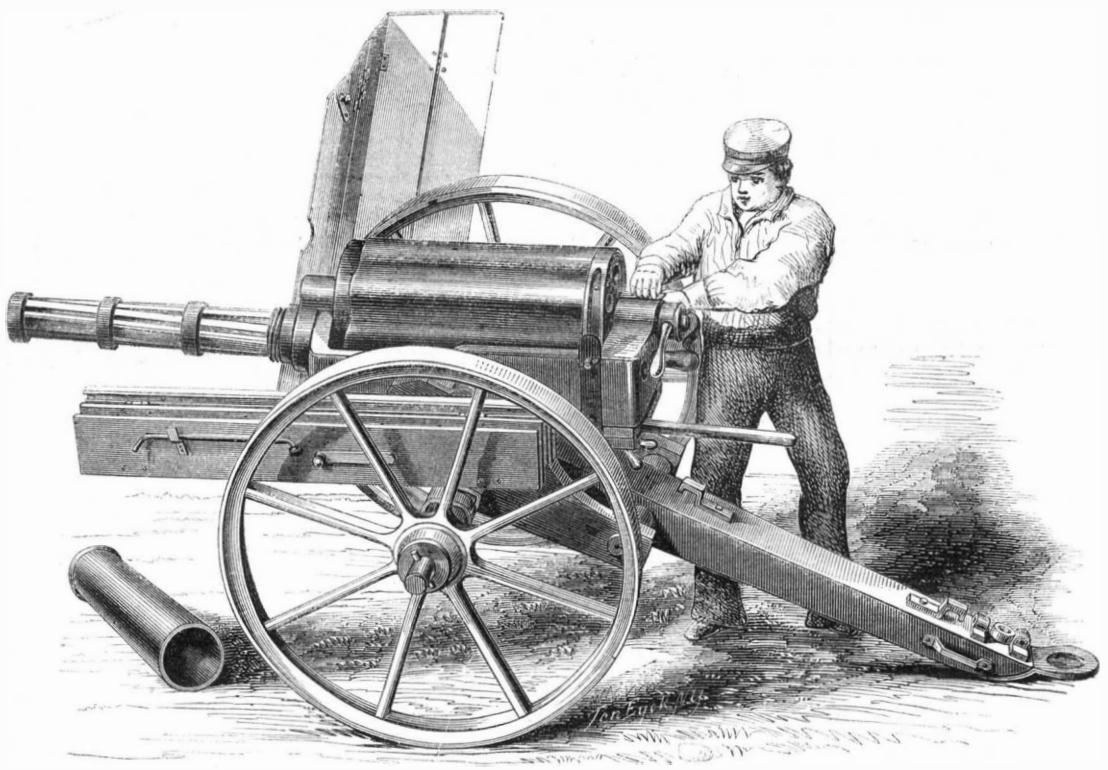
Mr. DIBBEN stated that there was a gentleman present, Mr. De Brame, who had invented a new revolving cannon. He had witnessed experiments with it, several members of the Polytechnic Association being present, and they had invited the inventor to exhibit and explain his model to the Association to-night.

At the invitation of the President,

MR. DE BRAME came forward and explained his model :—

In the revolving cannon of which this is a model, my main object was to produce entire coolness everywhere. Six chambers form the breech of the cannon ; and after one has been discharged, and the cannon is revolved, it is open at both ends, so that the gases which have been in the chamber can escape by the draft or ventilation through it.—At the next turn, the chamber is left free to be swabbed out by the gunner, &c.—There are always four chambers open to the air so that each chamber is cooling through four successive discharges before it is reloaded. The next thing to be done is to secure ventilation of the barrel, which remains fixed. To accomplish this I have hit upon a very strange device. It occurred to me that the object of the barrel being chiefly to give direction to the shot, it was not necessary for it to be closed. I have, therefore, retained of the barrel only the bars constituting the rifling of the cannon, keeping them in place by surrounding them at proper intervals with rings. These bars, of course, will give the same direction to the shot as if the barrel were closed, while the air passes freely through, and therefore the barrel cannot get heated.

I have been told by many persons that the expansive force of the powder ought to follow the ball up to the muzzle, and if there were any holes in the barrel a portion of that expansive force would be lost. I am not much versed in the principles of artillery, but I can tell you the results of my own experience and experiments. By surrounding these bars with this tight fitting covering, I can convert it into a closed barrel, in which the element of friction will be precisely the same. I have charged this cannon with single, double, and triple charges of powder, and fired into targets made of a thousand sheets of paper, first with the closed barrel, and then with the open barrel. I have made these experiments before many scientific gentlemen, and yesterday before three members of the Polytechnic Association—Messrs. Stetson, Dibben, and C. W. Smith. I requested Mr. Dibben to prepare the charges of powder, that he might be sure that the same quantity and same kind of powder should be used in both cases. We found, as these gentlemen can testify, that the penetration was considerably greater with the open than with the closed barrel. This result I have found not only with this small model, but with larger pieces. I have taken two Hall's carbines, identically alike, opening the barrel of the one and leaving that of the other untouched, and have found that the projectile would come with at least as great force from that which I had opened, as from the other.



DE BRAME'S REVOLVING CANNON.

The advantage of having a barrel that cannot get heated is very considerable. The Armstrong gun will shoot very accurately for a few rounds ; but the history of the Crimean, the Austrian, and lately of the Chinese war, shows that however accurately these and the French rifled cannon may perform at first, after thirty or forty rounds the aim cannot be depended upon. The reason is obvious. If the particles of metal are ever so slightly expanded upon one side more than upon the other, it curves the barrel sufficiently to injure the accuracy of the aim. With free ventilation, this injurious effect cannot be produced.

I have added to my cannon a little device suggested to me by an article in the SCIENTIFIC AMERICAN six or eight weeks ago, which stated that sharp shooters at 800 yards distance could shoot down, within sixty seconds, every horse, and disable every man of a battery. I have added, therefore, this protecting shield or screen, which ordinarily lies between the trunnions and the wheels, but when to be used by the flying artillery, may be very quickly unfolded, and will be proof against the balls of the Minie rifles, protecting the gunners and the horses. Of course, I should not expect so light a structure to be proof against cannon balls ; but its elasticity and strength will be sufficient to protect those who are behind it from the sharp shooters. This little model is made upon a scale from the 6-pounders used in the army. Seven and a-half times its size corresponds to the size of the 6-pounder. It is evident, therefore, that there will be the same amount of room for the folded shield on the 6-pounder as on the model.

The performance of this little piece has been witnessed by General Hall and all his staff, and also by Colonel Rowan, C.B., of H. B. M.'s artillery, now in this city, who was in the Crimean campaign, and is a thorough scientific man.

I omitted to mention that the principle of this cannon removes the objections to revolving cannon which have heretofore proved insurmountable. It has been found that revolving cannon could not be fired oftener than single barrels, on account of the heat, and the free ventilation will prevent that. It will be observed, too, that the weight of a revolving gun will be very materially diminished by opening the barrel in the manner I have described.

MR. STETSON—Mr. De Brame has explained this so fully and clearly as to leave very little for us to say further than to certify to the facts in the experiments we witnessed.—We saw the piece charged and fired repeatedly.—The charges were prepared under the immediate supervision of Mr. Dibben, so that there could be no deception about it. We found that the penetration without this cap was greater, the difference being distinctly recognized by counting the sheets of paper through which the balls passed. It would require further trials upon a larger scale to determine whether the theory is true, but all the experiments with this model were favorable to the invention.

The sheet iron curtain is a separate invention, and seems to be entitled to be regarded with favor. It is no new thing to use readily removable shutters in fortifications ; and I think they have been used on board ships in the American service, and used with very good effect when vessels were engaged in close action. It is evident that such a curtain can only be used with a breech-loading cannon, for it would be of very little use if the gunner was unprotected while

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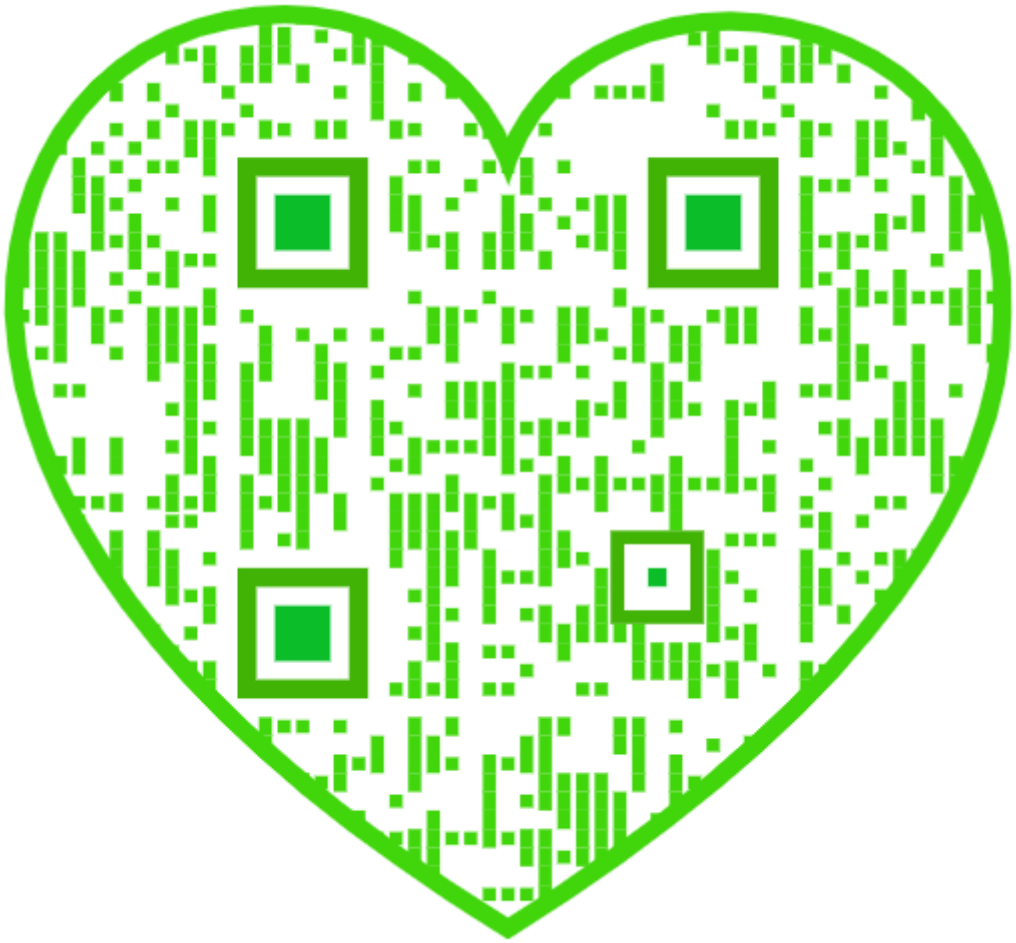

charging the cannon. The question what will be the effect upon them of the recoil of the gun, and whether any provision will have to be made to prevent their being shaken to pieces, will be best determined by the test of trial.

Mr. Haskell suggested that the cap which closed the barrel did not entirely prevent the air from passing the ball between the bars.

Mr. De Brame—I will remedy that.

The President (Prof. Mason)—Is it known how soon, after the explosion of powder and the beginning of the ball to move, the force of the charge has done its work upon the ball?

Mr. C. W. Smith expressed the opinion that the quality of the powder was an important element in answering the question. The friction of the barrel, especially for expanding balls, affects the result. The result of the elaborate series of experiments of the British government was, that the most convenient length for cannon is from 7 to 11 times the diameter of the bore.

Dr. Vanderweyde said that if the barrel is closed and too long, the ball would be retarded for the last part of the distance by the resisting pressure of the air in front of the ball becoming greater than the continually diminishing force of the powder. In such a case, making the barrel shorter, or opening the sides as in the model exhibited, would allow the escape of the air in front of the ball, and permit it to move freely from its inertia. This cannon certainly gives us the advantage of the greater accuracy of a very long barrel, without the disadvantage of the resistance of the air. It would seem as if the force of the powder would be expended through those openings; but the experiments seem to show that the powder burns too quickly for that. The friction, of course, is less, for the ball flies along upon a kind of rail with only enough friction to direct its course.

Mr. Rowell had witnessed experiments with rifle barrels to ascertain at what length the charge exerted the maximum force upon the ball, and the result was a barrel 22 inches in length was found to be the most effective. The remaining length of the rifle barrel then is only useful to direct the ball, and might be opened without injury.

Dr. Vanderweyde—Suggested that it would be an interesting experiment with this revolving gun to fire it with its maximum charge over white paper, to determine whether any of the powder escapes unburned.

Mr. De Brame—I will try that experiment.

ARTIFICIAL FORMATION OF ICE.

Prof. Twining—Explained his method of forming ice by the evaporation of ether: and a debate ensued upon the subject of refrigeration.

The subject of "Cooking and Portable Apparatus for Cooking was selected for the next meeting.

On motion the Association adjourned.

[Mr. De Brame filed a caveat in the early part of this year on his invention, but has now applied for a patent for a skeleton barrel, after the most satisfactory experiments and results obtained by him with the open barrel. As to the portable shield, he is now preparing his documents and application for a patent, which will be a valuable one, the merits of such a protection being self-evident. J. A. De Brame's address is at No. 707 Broadway, N. Y.—Eds.

Bullion in Profusion.—The total receipts of gold and silver at the Assay Office, for remelting, during the week were: Gold, $3,500,000; silver, about $300,000. $500,000 of returns were received on the 8th inst., and it is expected that the receipts hereafter will average $400,000 per day. The average amount received daily heretofore was $150,000. Specie dealers are much gratified at the increase. A large amount of foreign coin has been deposited for recoinage. $2,500,000 arrived in this city last week from England. It will soon work its way to the pockets of the people.

United States Mint.

The business of the United States Mint, at Philadelphia, in May, was as follows:—

	No. of pieces.	Amount.
Gold coinage	385,857	$5,104,415
Silver coinage	1,697,000	269,210
Copper coinage	1,100,000	11,000
Total	3,182,867	$5,384,625
Total coinage executed during the months of January, February, March, April and May, 1861		$31,123,206

THE WAR.

THE ATTACK ON PHILLIPPI.

At the close of our last week's summary, we gave a brief telegraphic account of an attack upon a body of secessionists at Phillippi, in Virginia, by a portion of General McClellan's forces advancing from Ohio. The Wheeling *Intelligencer* furnishes the following detailed history of the operations, which is very interesting:—

The attack was made by four regiments in two divisions, one consisting of the First Virginia regiment, part of the Sixteenth Ohio and Seventh Indiana, under the command of Colonel Kelly; the other consisting of the Ninth Indiana and Fourteenth Ohio, under Colonel Lander of wagon road and Potter and Pryor duel notoriety. Colonel Kelly's division moved east, by railroad, to Thorntown; from thence he marched to Phillippi, 22 miles. The Indiana regiment moved by railroad to Webster, where they were joined by the Fourteenth Ohio, from which place they pushed forward on foot to Phillippi, 12 miles distant. The march of the two divisions was performed through darkness, rain and mud. It was a terrible undertaking, but they all went bravely through it unshrinkingly, and without complaint. All night they had toiled on through the darkness and storm, the soft earth yielding beneath their feet, till the gray dawn found them in the neighborhood of the enemy. Colonel Lander reports that he arrived on the hill across the river from below Phillippi, and commanding the town, before daylight. He at once prepared to open on the rebels at the appointed time, 4 o'clock being the hour at which the attack was to be made simultaneously by both divisions. Colonel Kelly was to attack them in the rear and cut off retreat, while Colonel Lander would assail them in front, but Colonel Kelly's division was behind, owing to the fatigue of the forced march, and being misled by guides.

When day began to dawn upon Colonel Lander's impatient forces, it discovered to them the camp below in a state of great commotion, evidently in great alarm, and preparing for a fight. The hour appointed for fight came and passed; but still Colonel Kelly's division had not arrived.

Impatient to begin the attack, and fearful that the rascals almost within his grasp should escape without smelling powder, Colonel Lander ordered his artillery to begin the attack; and at a quarter past four, the guns were unlimbered and dropped the first messenger of terrer into the rebel camp. Simultaneously with the roar of the first gun, Col. Kelly, at the head of his command, came in sight across the river below the camp, and comprehending the position of affairs, he rushed forward in the direction of the camp. Meanwhile, the battery having got accurate range, played upon the camp with marked effect, tearing through the tents and houses at a fearful rate. This the chivalry could not stand, and they scattered like rats from a burning barn, after firing at random a volley which did no damage.

Col. Kelly's command was close after them, and, at the same time, Col. Lander's force came rushing down the hill yelling like Indians. After chasing them a few miles, the already exhausted men returned to evacuate the camp, to learn the painful fact that their victory, though complete, was too dearly bought. Col. Kelly, who, with bravery amounting to rashness, was foremost from first to last, was rallying his men in the upper part of the town, the enemy having all apparently fled, when he fell by a shot from a concealed foe. The assassin was an Assistant Quartermaster in the confederate forces, named Sims. He was immediately seized. In the gray, uncertain light of the morning, it was impossible to tell anything about the loss of the enemy, as they carried off their killed and wounded. A leg, which had been torn off by a cannon ball, was picked up in the camp. There was a great deal of blood on the ground, and all along the road in the direction of their flight. Hats, blankets, coats, and every description of luggage, lay scattered along the road for more than a mile.

It is also reported that the number of arms captured is 780 stand, quite a number of horses, and all their camp equipage and provisions. The rebel camp flag was also captured and brought into headquarters. It consists of a blue field with eight stars, and two brown and one white stripe. The field is torn by a cannon ball having passed through it. The privates of Col. Kelly's command are amusing themselves by strutting around with sword and small arms, cocked hats, and other paraphernalia of the secession camp.

Soon after the retreat of the secessionists, a train of cars came in with 15 boxes of flint muskets, forwarded to them by Governor Letcher. The other arms captured are not of much account. A great number of blankets were captured, which will be of much service to our men. The amount of camp goods taken is estimated at $25,000. The officers were well dressed and equipped, and were what were denominated the "flower of the chivalry;" but the men, except the dragoons, were badly equipped, hastily got together, and will not fight, as there are among them many good Union men, who have been pressed into service. Col. Wiley, the secession commander, is a prisoner. The latest accounts represent Col. Kelly as recovering.

The muster roll was taken, which showed that the secession force amounted to 1,940 men.

The inhabitants of the town, who had been driven away by the traitors, soon flocked homeward, telling of their persecutions. Young women and children had been two days in the woods: farmers had been robbed of their produce, never receiving any pay; 200 sheep were taken from one. A forced loan of $25,000 had been demanded of the bank at Fairmount, and was to have been paid two hours after the payés fled. Men were frightened into the rebel service by assertions that, if caught by the Federal army, their heads would lie upon the block. For their deliverers, the people were ready to do anything. They refused to accept payment for milk and other produce, which they forced upon them. Everywhere the patriot soldiers were welcomed; everywhere the patriot Virginians were eager to join their ranks.

The secessionists, in order to cover their chagrin, report that "10,000 abolitionists came down upon them at Phillippi, and that they cut their way through, killing 1,000 men." These terrible "abolitionists" are probably hovering all over the South in balloons, ready to come down.

SEIZURES OF ARMS.

Governor Hicks of Maryland seems to be active in doing loyal duty to the cause of the Union and the constitution. During the past week Colonel Petherbridge, by the order of the Governor, made a demand for the four brass field pieces used by the Eagle Artillery. They were promptly surrendered and delivered to the commandant at Fort McHenry. The brass field pieces of the Junior Artillery were also taken possession of by the agent of the Governor, as well as the rifles of the Wells and McComas Riflemen. From the Eagle Artillery armory everything was taken, including sixteen sets of harness, 1,200 pounds of round and canister shot, 300 pounds of powder and forty muskets. Two of the field-pieces were the property of the company, and were a present from the late Commodore Daniels. Several thousand pounds of gunpowder were also seized by the U. S. Marshal. Seven thousand yards of cassinette and other military goods were seized at Adams' Express Office on the 10th, consigned to Point of Rocks, *viâ* Alexandria and Loudon railroad, valued at about $10,000. On the 10th, Colonel Abel Smith, of the 13th (Brooklyn) Regiment, returned to Annapolis from Easton, Md., on the eastern shore of Maryland, where he captured one thousand stand of arms, six field pieces, and one sloop, as prizes from the secessionists. A good haul, certainly.

HORSES AND LOCOMOTIVES FOR THE ARMY.

One day last week two hundred horses from central Pennsylvania were passed over the Northern Central and Baltimore and Ohio railroads to Washington, for the use of government. At the same time, two locomotives from the Philadelphia and Reading railroad were received at the President street depot over the Philadelphia railroad, and were drawn by horses through Baltimore to the Baltimore and Ohio railroad, on which they were carried by steam to Washington. The locomotives were of Baldwin's ten-wheel class, weighing about 26 tuns each. It was understood they are intended for use on the Orange and Alexandria railroad, as soon as that route is opened to Manassas Gap.

A large number of U. S. army wagons are now in the Park, loaded with arms. They are *en route* for the seat of war.

There is the greatest activity in the Ordnance Department at the Navy Yard at Washington. A large number of men are employed in the manufacture of rifled cannon and shell, and in casting, furnishing and mounting howitzers. It is stated that sixteen thousand Minié balls are manufactured daily, and percussion caps are produced in immense quantities.

The State of Missouri is detached from the Department of the West and incorporated in that now under the command of Gen. McClellan.

BALTIMORE AND OHIO RAILROAD.

This magnificent railway, the pride of the people of the Middle States, has suffered immense damage in consequence of the rebellion. Several costly bridges have been destroyed, and the passenger traffic and the shipment of freight has been discontinued for the present to all stations except those East of Harper's Ferry. There is no knowing what additional injury may be inflicted upon this important road.

LOYALTY SOUTH.

A valued correspondent writing to us from New Orleans, under date of May 30th, says:—"I consider your discussion of our secession or war troubles as true and most impartial." In the same letter he expresses the hope that the Congress to assemble July 4th will devise some measures whereby the people will submit to one government. He asserts that every consideration, geographical, political, and social, requires us thus to unite." True, every word of it.

THE ADVANCE ON HARPER'S FERRY.

In our last summary we gave an account of the advance of two bodies of government troops toward Harper's Ferry; one from the West under General McClellan, and one from the North under General Patterson. Each consisted of some 15,000 troops, and was being rapidly augmented by reinforcements from the rear. Our account left General Patterson at Chambersburg, and General McClellan's advance at Grafton,

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198 miles west from Harper's Ferry. We have since intelligence of General McClellan's forces having reached Cumberland, which is 97 miles west of Harper's Ferry, and General Patterson has also commenced his movement from Chambersburg. On Sunday, June 3d, three regiments of his command, under General Williams, arrived at Greencastle on their way South.

GENERAL CADWALLADER AT FREDERICK.

At Frederick, in Maryland, on the Baltimore and Ohio railroad, 12 miles northeast of Harper's Ferry, a body of some 4,000 troops have been stationed for some time, and on Monday, June 10th, General Cadwallader proceeded from Baltimore to take command, and join in the general advance on the Ferry.

THE MOVEMENT WEST FROM WASHINGTON.

On Monday morning, June 10th, an important movement of troops was commenced from Washington up the Potomac to co-operate in the attack on Harper's Ferry, which is 57 miles above Washington, on the same river. The Rhode Island regiment, with its company of flying artillery, was sent round through Baltimore to join General Patterson's command, and the following regiments marched up the left bank of the Potomac:—First Connecticut, First New Hampshire, First Maine, First District Volunteers, Fifth New York, Ninth New York, and Nineteenth Auburn, New York. These troops will be commanded by General Cadwallader. Harper's Ferry is a very strong position, and the rebels are intrenched there with an abundance of artillery. Still it is hoped that Federal forces may be concentrated in sufficient force to take the place without a serious engagement.

SKIRMISHING ALONG THE POTOMAC.

To prevent our troops from crossing the Potomac by boats on the still ponds formed in that river in the construction of the canal which runs along its side, the secessionists have been attempting to destroy the dams by which these ponds were formed, and several skirmishes have taken place between them and the loyal inhabitants of Maryland. It is said that the destruction of the dams has in all cases been prevented; but the rebels have burned at least two bridges across the Potomac—one at Berlin and one at Point of Rocks. They have also seized and burned several canal boats.

OPERATIONS AT WASHINGTON.

There are now in Washington and vicinity 45,000 Federal troops, under command of General Scott, and the most formidable measures are being taken to entrench the army against the possibility of successful attack. The Washington Light Infantry are entrenching above the Chain Bridge, and will mount four pieces of artillery. Entrenchments are also being thrown up at the northwest of Arlington Hights, beyond the Chain Bridge, it being deemed important to check the possible passage of Virginia troops at that point. Cannon from the Washington Navy Yard are mounted upon the breastworks at Alexandria, occupying a good position, and forming a fine battery. About 100 32-pounders are mounted on different works commanding approaches to Washington, for a distance of some 10 miles, including Alexandria and the Chain Bridge.

The United States army is to undergo a thorough re-organization. Nearly all the junior officers of the present regular army will be promoted; and some eight hundred commissions will be issued for officers of the new regiments. All these nominations will come before the Senate at the ensuing session.

An offer has been made to the government for building, within six months, a steel-plated ship which will carry but one gun, but which will be bomb and shot proof, and capable of breaching any fortification; payment to depend on success.

The contractor for the "Union" gun, cast at Pittsburg, and intended for service at Fortress Monroe, states that the gun is rifled, and adapted to the use of General James' shot and shell. This will be the largest rifled cannon in the world.

THE ADVANCE OF GENERAL BUTLER.

By a glance at the map on page 289 of our present volume, it will be seen that Fortress Monroe is situated on the southeast end of a narrow strip of land lying between the James and York rivers; Richmond, the capital of Virginia, and now the headquarters of the secessionists, being 150 miles up the former river. It is manifestly the course of General Butler to advance up into Virginia and take Richmond as soon as he can; and, in the meantime, by threatening this important point, he keeps a large body of the rebel troops employed in its defence. To prevent the advance of General Butler, the rebels have planted batteries along the banks of both rivers, and have strongly entrenched themselves at various points on the strip of land between. Besides his forces at Fortress Monroe, General Butler has an entrenched camp at Newport News, a point on the northeast side of James River, where the latter enters Hampton Roads.

THE BATTLE OF BETHEL.

On Sunday, June 9th, General Butler, having been advised several days previously of the concentration of a body of rebels at the village of Great Bethel, about twelve miles from the fortress, where they had thrown up entrenchments, and were extending their outer line of pickets, determined, after consultation with his officers, to attempt to drive them away. Orders were accordingly given to several regiments to hold themselves in readiness to march at a moment's warning. At the same time orders were sent to the camp at Newport News for a detachment from that place to join the column at Little Bethel, a village on the road to Great Bethel, three miles from the latter.

The detachment from the fortress consisted of Colonel Duryee's regiment of Zouaves, Colonel Townsend's regiment from Albany, and a detachment of artillery of the regular army, consisting of four 12-pounders, under the command of Lieutenant Greble. From Newport News was sent the Seventh regiment of New York Volunteers, mostly Germans, under command of Colonel Bendix. The latter arrived first at the place of rendezvous. Colonel Duryee's regiment left the fortress at half past 12 Sunday night, being ferried over by volunteers of the Naval brigade, and were followed an hour after by Colonel Townsend's regiment. As the latter approached the place of meeting with the Seventh, two companies of the German's mistook our troops in the darkness for the enemy and fired upon them, killing one and wounding ten others. Colonel Townsend's regiment returned the fire, but without doing any harm. As the daylight increased the mistake was discovered, when the united forces moved forward to Great Bethel. The whole detachment was under the command of General Pierce, of Mass., one of the inexperienced volunteer Brigadier-Generals. As they approached Great Bethel, at about 10 o'clock, a masked battery of the rebels, which was stationed on the opposite side of a broad creek, opened fire upon them with terrible effect. The Zouaves marched up to the creek, but being unable to get across, were of course obliged to retire. Lieutenant Greble brought his howitzers into action, and the battle was continued for over two hours. It is stated that all but one of the rebel guns was silenced, when our artillery ammunition being exhausted, Lieutenant Greble determined to spike his guns and retreat. He had just spiked one of them, when a cannon ball struck him in the head, killing him instantly. General Pierce being satisfied that it was impossible to cross the creek, then withdrew his forces in good order. There are various reports in regard to our loss, but it is estimated to be some 19 killed and 47 wounded.

LIEUTENANT GREBLE.

The soldiers are enthusiastic in their accounts of the heroism of Lieut. Greble. They say he was the animating soul of the attack. He held the men up to their work with cool intrepidity, and served his guns under the hot fire with activity and steadiness until his ammunition was exhausted. He belonged to a wealthy Philadelphia family, and was educated at West Point. Great fault is found with Gen. Pierce for ignorantly leading his men to a hopeless attack. We little thought, when writing the article on another page, against the appointment of civilians to important military commands, that our position would soon be confirmed with such terrible emphasis by a disgraceful disaster resulting from this cause.

All accounts agree that the conduct of our volunteers in this action was admirable. They exhibited a daring and steadiness that would have done credit to veteran troops.

THE Enfield rifles, according to the London *Mechanics' Magazine*, have one turn in the twist every twenty inches. This has been adopted from the Whitworth rifle, which is constructed with the sharpest twist of any rifle in the world.

BALLOON OBSERVATIONS.—In our last number we alluded to the fact that balloons had been successfully employed to reconoiter the position of an enemy. This system has been adopted by our government, and a monster balloon was inflated a few days ago at Washington in the presence of a large assemblage of persons who had been attracted by the unusual sight. The balloon is a large oiled linen one, being about thirty-five feet in diameter, and above fifty feet in hight from the car to the top. The inflation was under the direction of Mr. James Allen, late of the firm of Allen & Hunt, and a member of the Rhode Island Marine Artillery. Mr. Allen, who has considerable experience in navigating the air, has been appointed aeronautical engineer by the government, and will be employed during the hostilities in taking observations of the enemy's camps, movements, &c. After the inflation was accomplished, the balloon was moved to the camp of the Rhode Island regiment, near Glenwood, where it was sent up to a considerable hight. Major Meyer, of the army, who is the signal officer, will have the superintendence of the balloon, as well as all other apparatus of the kind used in the army.

A QUEER CURRENCY.—Judge Russell, of this city, has recently returned from Virginia, where he procured specimens of the shinplaster currency with which secessionists are carrying on war against the Union, representing the large sum of twenty-five cents. The plaster is a strip of ordinary paper, printed in red ink. It promises to pay twenty-five cents in current bank notes of the State of Virginia, presented in sums of five dollars or multiples thereof, receivable also for postage and freight. The plaster boasts two vignettes, one representing a train of cars, the other a reaper with a sheaf of wheat. The utterers are the Alexandria, Loudin and Hampshire Railroad Company.

SOMETHING WRONG.—A few days ago two heavy guns were sent from Pittsburgh to Fort McHenry, and while lying at the wharf in Baltimore, some scamp spiked them with rat-tail files. It was at first thought that they would haue to be re-cast, but latest report says they have had new touch-holes drilled, and are now ready for action.

The monster gun "Union," manufactured at Pittsburgh for Fort McHenry, was lost overboard at Baltimore, while in the act of being raised for reshipment. It will be raised at once and without difficulty. What is the matter down there at Baltimore? Is there no one to see to Uncle Sam's things? Why are valuable guns left unguarded in this manner? Surely there is something wrong down there.

BETTER RIFLED CANNON WANTED.—All the improved firearms by which a number of inventors are now making large fortunes have been illustrated and described in the columns of the SCIENTIFIC AMERICAN. Perfection has not yet been attained either by Napoleon, Whitworth or Armstrong. There is still room for improvement. A rifled cannon can be made to shoot as accurately as a prize rifle at rest; but this has never yet been done "by a long shot."

THERE are now 55 steam vessels of war in course of construction at the several dockyards belonging to the British government. These do not include the large iron-plated frigates *Warrior* and *Black Prince*, which are being built by private firms. These 55 war vessels will average 1,637 guns, and have engines of 12,100 nominal horse-power.

CHANGES IN THE PATENT OFFICE.

S. T. Shugert, Esq., who for many years past has held the position of Chief Clerk in the Patent Office, is removed, and John L. Hays, Esq., of New Hampshire, is appointed to fill the place. Professor Charles G. Page is appointed a Chief Examiner in the Patent Office. Dr. Page was formerly in the Office, and is an accomplished officer. In consequence of a great reduction in the amount of business before the Patent Office, caused by the rebellion, we have no doubt the Commissioner of Patents will be compelled to make several removals. We trust that in doing so he will use the utmost care so as not to turn out those who have done honor to the office.

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INDIA-RUBBER MANUFACTURES FOR ARMY AND NAVY PURPOSES.

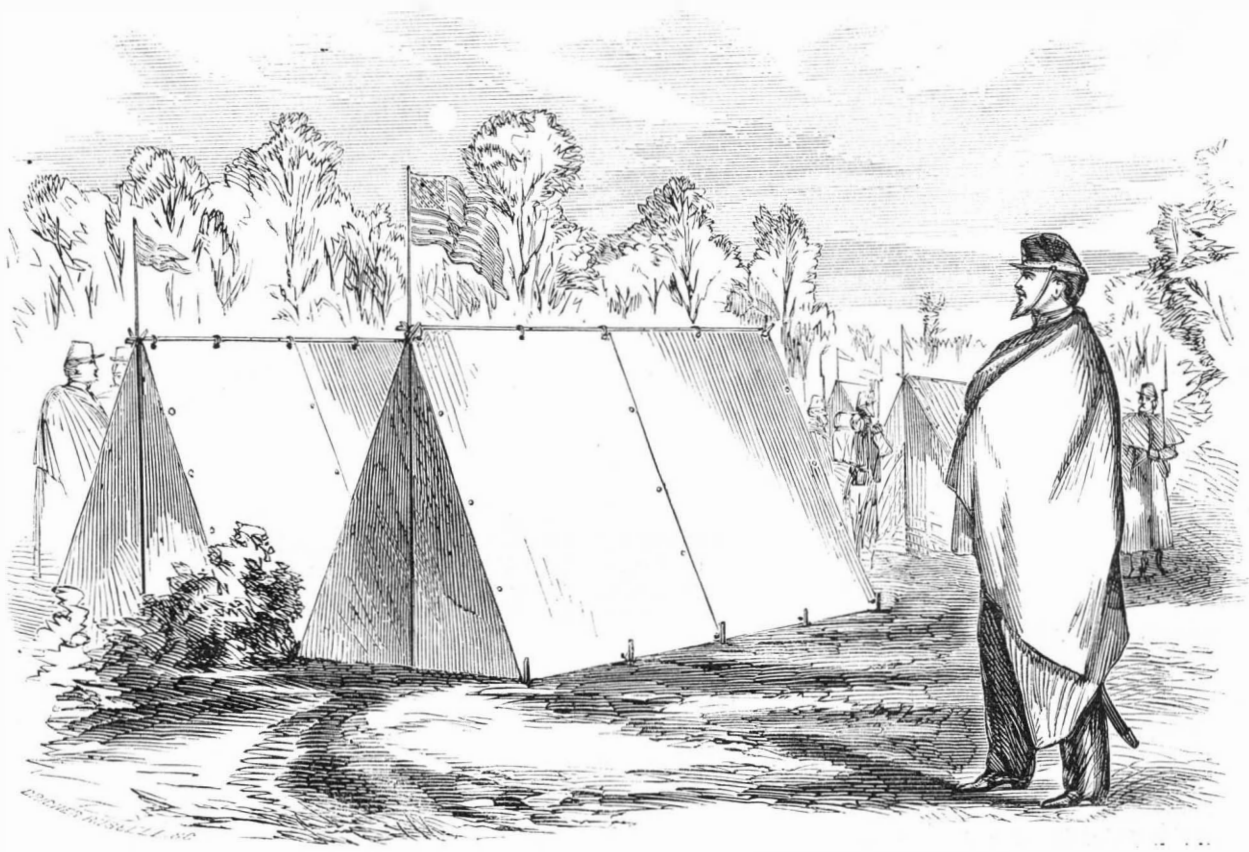
We notice with no small degree of pleasure that our leading manufacturers and mechanics are exercising their ingenuity—doubtless with considerable profit to themselves—in promoting the health and comfort of our soldiers and marines. Much has been done, and is still doing, to improve firearms and other implements of war, also those articles and agencies which tend to promote the health of man, mitigate the privations of war, and render the army and navy more efficient. As usual, foremost among our inventors in these times, we find the enterprising representatives of that peculiar American manufacture—india-rubber. The hitherto almost innumerable uses of this peculiar substance have by no means exhausted its useful applications.—New wants have called forth new appliations, and india-rubber promises to be as indispensable for the army and navy as it has proved in the industrial peaceful arts. The great establishment for the manufacture of these goods is the Rubber Clothing Co., which has its business places in New York, Boston, Philadelphia, Cincinnati and Chicago. By its energy and extended arrangements, it has almost monopolized the entire business.

In the early years of the india-rubber manufacture, attempts were made to introduce rubber goods into the army, but this was a premature action, as the art was not then sufficiently developed. The consequence was that the goods which were then made failed to give satisfaction, and they became the occasion of a prejudice among the officers of the army which it has taken years to remove. The improvements which have in recent years been introduced into the india-rubber manufacture have, however, been gradually sweeping away this prejudice, and now many of our most distinguished officers are advocates of their introduction.

It is our purpose, at this time, to describe some of the ingenious and useful articles of equipment manufactured by the Rubber Clothing Company, whose place of business, in this city, is located at 201 Broadway. The important feature in this great business is the new material itself, which, under the name of "black enamel rubber," has acquired great popularity. It is produced upon cloth of all kinds—heavy linens, cotton ducks, woolen and cotton flannels, as well as thin cotton and linen fabrics. The special advantages which it possesses over enamel leather is that it never cracks, and it is perfectly water proof. Its surface is as bright as that of enameled leather, and it is destined to supersede most other articles for many army purposes. Perhaps the most important article made of enameled india-rubber is the soldiers' waterproof camp blanket. Common sense will at once demonstrate the advantages of such articles as being almost indispensable to the health of soldiers in the field. It has been very extensively introduced already, and we think it is the duty of the commanding officers to call upon the government or State authorities to supply one to every soldier under arms. Officers' blankets are made of scarlet and blue flannels, coated with rubber. White and colored cotton flannels are also treated in the same way for privates. A great variety of sizes, differing in weight, are made upon cotton and linen drillings, &c. Officers prefer the large heavy blankets, and they often cut a slit in the middle, just large enough to slip the head through, thus forming a regular poncho, such as the wild horsemen of the Pampas use. The blanket thus worn proves a perfect protection against the most severe storms. For privates, the light blankets are recommended, on account of their cheapness and weight. One of these is rolled in a small package, and carried on the knapsack without inconvenience. In wet weather, it is used as a waterproof cloak, which is comfortably worn in camp and on march.

The uses to which the blanket can be used are multifarious. In Fig. 1 it is represented as applied for a waterproof cloak, and also as a tent. For the latter purpose, four of such blankets, with eyelet holes around the edges, are stacked up, laced together by cords, and fastened to stakes in the ordinary way. Or

Fig. 1.



for a bivouac tent, these blankets may be stacked up with crossed muskets, the bayonet being run through the eyelet holes at the top, with a musket stretched horizontally as a ridge-pole. In this manner a tent can be erected in a few minutes, without carrying a single stick or an extra yard of canvas. These tents, it will be observed, can be erected almost instantaneously, and by turning the inner side out, they will serve as a protective shade from the heat of the sun, when halting for rest during a march.

Fig.2

In Fig. 2 we have another useful application of this blanket, in the form of a combination knapsack, such as are used by the celebrated regiment of firemen Zouaves. In addition to the eyelet holes around the edges, it has suitable straps and buckles, by means of which it is folded up and fastened, as shown in the engraving.

Fig. 3 represents a rubber canteen for carrying water. It has an ingenious filter in the mouth-piece, which was invented at the suggestion made in the Scientific American some weeks ago. Some of the officers in the army have hastily condemned such canteens, because when new they impart a slightly unpleasant taste to the water. A new wooden or tin canteen does the same, but this odor soon disappears. The army officers and privates who used rubber canteens in the Mexican campaign, we are informed, commended them highly. They preserve water in a superior manner, which is a very important desideratum towards maintaining the health of soldiers in the field. Dr. I. V. C. Smith, the distinguished Oriental traveler, and editor of the *Medical and Surgical Journal*, has verified these statements by his experience. The following extract is taken from that journal in the year 1851 :—

"It occurs to us to mention a kind of discovery in regard to the preservation of water, so that it may at all times be potable, which may be of service to future travelers circumstanced as we have been, in tropical regions where no water is to be found, and that important element is necessarily carried from one extreme point of country to another. On leaving Cairo, to ascend the river Nile, the last autumn, about two gallons of river water were put in an india-rubber bag, securely corked, and placed in the hot sun, on the deck of the boat. On reaching the first cataract—the labor of some weeks—the water was found to be excellent, there being no escape of gas on withdrawing the cork, nor any degree of odor, which was an evidence that no fermentation or working, as the sailors term the process, had taken place. It was kept in that exposed condition all the way down that remarkable stream, and at the end of six weeks had apparently undergone no change whatever. One week after, an expedition was started in the desert, and at the horn of a camel's saddle, water in the same bag was suspended in a traveling sack twenty-one days, under the direct rays of the sun. From time to time, as inclination or necessity prompted, a swallow of the precious fluid was taken, and it was really delicious. Water carried in the whole skin of an animal in the ordinary manner, for general use, became excessively offensive in the desert in a few days, beside assuming the color of a pale decoction of coffee. Now this is a simple statement of the difference of the quality of the water in the two receptacles; and is it not obvious that the india-rubber one possessed manifest advantages over the other?"

Fig. 4 is a rubber haversack, a most useful and necessary article for every soldier and traveler. They are undoubtedly vastly superior to the kind in ordinary use, which are made of cotton duck; the cotton soon gets saturated with grease from the rations which

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the soldiers are often required to carry in them, and they not only look very filthy, but they soil the uniform of the wearer. In the use of india-rubber haversacks such evils are entirely overcome.

Fig. 5 represents an india-rubber mattress, which is waterproof, and is well adapted for both sea and land service. Its merits will at once be appreciated by a glance at the engraving.

Fig. 6 represents leggings for keeping the legs dry in wet weather, on board of vessels, or when marching, or riding on horseback. To the clothing department, the Rubber Company has paid great attention, and

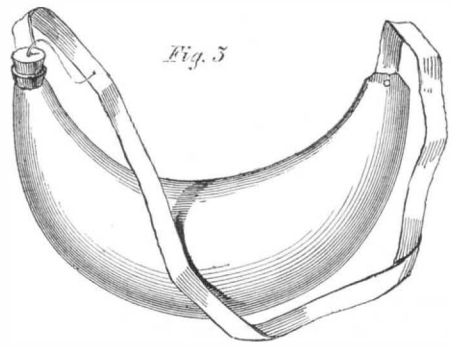
Fig. 5

various styles of coats, cloaks, hats and caps, are manufactured and specially designed for officers and privates, to be worn as covers, to protect their uniforms and arms. Enamel covers for the saddles of dragoons have just been introduced for the first time, and are highly approved.

Fig. 7 represents a portable india-rubber boat, a very ingenious and useful article. It is made of stout rubber cloth, extended over a tight jointed frame. It is so compact that a boat 12 feet in length and 4 in breath can be folded up and packed in a box three feet long. Pontoons made of india-rubber are very serviceable and convenient for an army. A single wagon can carry a great number of them, as so many rolls of rubber cloth. When required for use they are inflated, and in a very short time can be connected

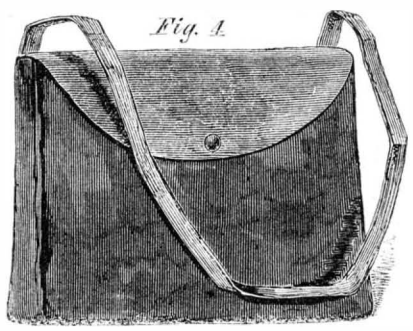
Fig. 4

together and formed into a military flying bridge of sufficient strength to carry infantry and artillery. This company frequently makes wagon floats, or light pontoons, on which loaded wagons can be transferred over rivers, preserving their contents from getting wet. Rubber covers for army wagons, to protect baggage and ammunition, is another important branch of their manufacture. They are made with grummet holes around the edges like the soldiers blankets, and are thus capable of being formed into hospital tents. Their adaptability for this purpose, in cases of emergency, cannot be over-estimated by surgeons and

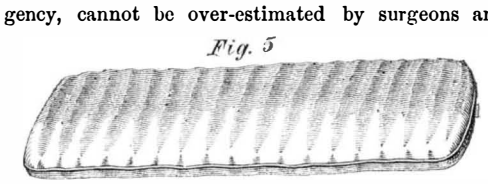
Fig. 5

officers who regard the comfort and lives of the soldiers. Other improvements in this department consists of air cushions and pillows for the sick and wounded. They are so formed that they can be arranged to support the weight of a wounded limb, and relieve it from pressure, thus relieving the patient of much pain. These ingenious appliances have been examined and approved by some of our army surgeons.

An ingenious and important apparatus made by this company is the submarine armor, represented by Fig. 8. It consists of a copper helmet which covers the head and protects it from the pressure of the water. Small glass windows are inserted into the helmet, through which the diver sees clearly when engaged at the bottom of a river. Hose of rubber connect with the helmet, and through this air is supplied for respiration from a small air force and suction pump, which is kept in the boat that attends the explorer. The utility of this apparatus for submarine explorations will be understood and appreciated.

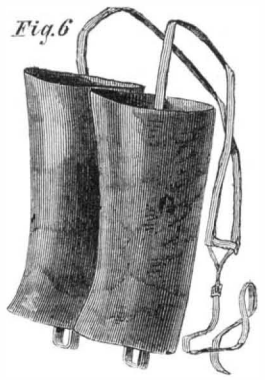
Fig. 6

The Rubber Company also manufactures the ordinary "Sibley tent," as well as the officers' marquee. These tents are made of double webs of light canvas, with a thin sheet of rubber interposed between them. The rubber they employ is not the kind used in making blankets and knapsacks, but a special preparation perfectly free from odor is employed. These tents are so far superior to canvas, we hope our government will order a full supply for hospital purposes at least.

In closing this article, we are glad to be able to notice a fact which is worthy of record. A short time before the bombardment of Fort Sumter, cash orders were given to the Company for 40,000 yards of their celebrated enamel cloth by parties in New York. Shortly after some circumstances excited suspicion, and close inquiries elicited the fact that this, although

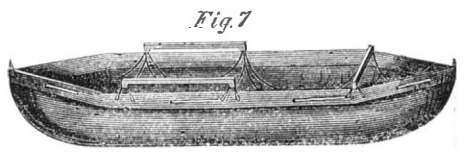
Fig. 7

ordered for export to Europe, where this cloth is now much used, was really intended for the secession army. As soon as this was discovered, we are informed, the order was immediately refused, and not a yard of the cloth was delivered.

We have called the attention of our readers to these ingenious devices for the comfort of our soldiers, because it is a question of great public importance. The Northern soldier is not the mere "animated machine" of European regulars, but has a heart in his work, and buckles on his regimentals to fight

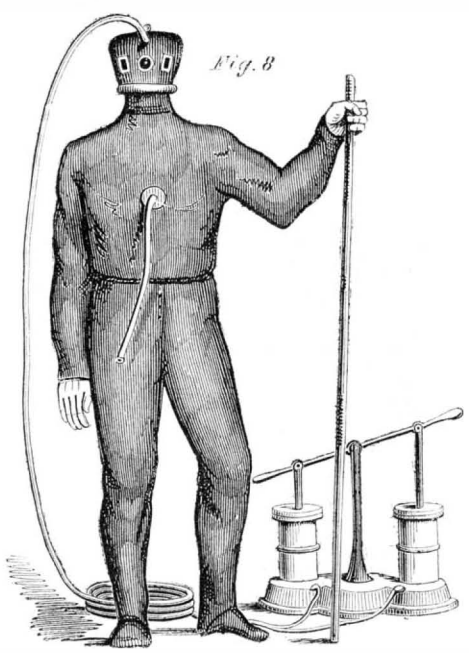
Fig. 8

for right, and should be well cared for by our government. In our ranks are intelligent and well-educated men, ingenious mechanics, citizens skilled in all the important arts of peace. They have left their homes to meet the dangers of disease and battle, not like mercenary troops fighting for pay, but as patriots who are fighting the battle of liberty, law, civilization and the government of the people. Every soldier is an independent, thinking man. Armed with the ingenious weapons of modern warfare, he fights with his brain as well as his hand, and the battle will be to the thoughtful, as well as to the strong. Such soldiers are not to be left to die by exposure and disease by the American people. In our advertising columns will be found an advertisement of the Rubber Clothing Company.

Wood Fuel for Locomotives — Protecting Boilers.

The following excellent article is taken from the *American Railway Times*:—

A cord of green pine contains over one tun of water, and where a railroad company freights their own wood, the cost of moving a few thousand tuns of water is something. But looking at its great loss. Of every 100 pounds of green pine, 44 are water, and only 56 wood. At least 34 pounds of the water can be dried out in common seasoning. But all the water not dried out will be converted into worse than useless steam in the furnace, among the fire, and it will require a large part of the heat from the surrounding fire to generate this steam. Taking again our 100 pounds of green pine, of which are—

	Pounds.
Water	44
Required of dry pine to convert 44 pounds into steam, at least 1 pound of pine to 4 of water	11
Total loss	55
Remaining for use	45

Thus, more than half the weight of pine wood is lost by burning it green, while more than one-fifth, or 20 per cent. of the actual cord measure of the wood is lost in convert- its own sap into steam.

Of 100 pounds green white oak, over 38 per cent is water, of which more than 34 pounds may be "seasoned" out. Of green poplar, 55 pounds out of 100 are water, of which full 50 pounds may be seasoned out. Of beech, 42 pounds are water, of which seasoning will get rid of 40. Of green sugar maple, 32 pounds are water, of which at least 29 or 30 may be seasoned out. Of green pine, as before stated, 44 pounds of every 100 are water, of which at least 40 pounds may be dried out.

Now, by experiment, while a cord of oak and a cord of pine are totally different matters, a pound of dried oak, or beech, or ash, or maple, either or all, have very nearly the same evaporative power as a pound of dried pine. And after we have begun to season our wood, and to weigh it, which is the only way of knowing how much there really is of it—after we have done this, we should measure the water used. An engine has two distinct functions to perform—to generate and to apply steam. We should burn our fuel and apply our steam economically. As it is, we do not know whether we burn our fuel economically or not, except by comparison.

Nearly all the improvements making in locomotives are directed upon the machinery, not upon the boiler. If we apply a valve motion which saves steam, it saves fuel only indirectly, and has nothing to do with the burning of the fuel or the economical generation of steam. So, too, if we only improve our boiler, we do not affect the economy of applying the steam—we have to make as much steam as before, only we continue to make it with less fuel. Two engines may have, one the most economical of boilers, the other the best possible valve motion, and neither engine, as a whole, will be economical. The problem is this: to use the least possible steam, and to make that steam with the least possible fuel. Then we should learn to look after our boilers, and to make our fuel go further in making steam. Then should we see the value of covering our boilers up with felt, using feed heaters, combustion chambers, tight grates and dampers, good water, and many other matters.

We lose fuel in many ways. We don't half cover our boilers, and what is put on is far more for ornament than for use. If we could make boilers perfectly smooth outside, without laps or rivets, our builders would be generally sure to put on the Russia iron without wooden lagging underneath. The firebox—the very part of all needing protection, and having very nearly as much outside surface as the whole barrel of the boiler—is generally left uncovered. The color of the black varnish is also the worst possible for radiation. We fancy that engineers on the Illinois prairies in winter know something about the influence of cold air in cooling off the boiler and dropping the pointer of the steam gage.

LARGE FORGING.—New England may well be proud of her mechanics; they are the true source of her great wealth and influence. We are apt to give too little credit to our home influences, and to enlarge upon those farther away from us. We could not but think of this a day or two since, while at the works of Messrs. Lazell, Perkins & Co., of Bridgewater, Mass. Among other remarkable things, we saw a couple of shafts made for the Pacific Mail Company's new steamer *Constitution*, which showed as good work as one could well wish to see. These shafts are 28½ inches in diameter, 34 feet 4 inches in length, and weigh about 25 tuns each, finished. The connecting rods each weigh about 6 tuns, and handsomer specimens of forging cannot be found in this country.—*Railway Times*.

WHISKY AS A PERFUME.—The Milwaukee *Sentinel* says:—"A jug of the celebrated Montreal malt whisky has been sent to this office to be tested. As no one connected with the establishment imbibes whisky, we use it for perfume on our handkerchief. When we want to attract a crowd, all we have to do is to go out and shake our linen at the corner."

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Brigadier-General Prentiss.

One of the most conspicuous personage of the notable men, civil and military, is General Prentiss, now in command of the Union forces at Cairo, Ill. He has a history of which more prominent men East might be proud.

Brigadier-General Benjamin Mayberry Pentiss, commanding the First brigade Illinois State Militia, was born in the town of Bellville, Wood county, Va., on the 25th day of November, 1819, and resided there until 1836, when he, with his parents, removed to the State of Missouri, where he remained until the autumn of 1840. Then attaining his majority he emigrated to and settled in the village of Quincy, Ill., his present home. Having from his early youth a fondness for military life, he no sooner found himself a freeman than he set himself about organizing a military company in his new home, and the Quincy Blues were the first fruits of his military genius. This fine company, under the tutorship of Captain Prentiss, obtained an honorable notoriety and invincible name, and the organization was quoted as an example for the guidance and discipline of many of the companies since denominated the "crack companies" of the West.

When, in 1846, the war with Mexico was precipitated upon the nation, Captain Prentiss answered the call of President Polk for volunteers, with a tender of his command; it was received and denominated Company I, First regiment Illinois volunteers, and mustered into service; new officers were appointed to command at the request of Captain Prentiss, and he was tendered and accepted the position of Adjutant in the staff of Colonel Hardin. When the army of General Taylor reached Saltillo, the captaincy of the company became vacant, and at the unanimous request of its members Adjutant Prentiss again took command, and at the battle of Buena Vista the company was awarded the post of honor of garrisoning the town of Saltillo. Captain Prentiss and his command were favorites of General Wool, and were assigned many important trusts, not one of which was ever dishonered.

At the close of the war the Quincy boys returned, and were received with every manifestation of delight, and were honored by all sorts of demonstrations that could show the approbation of a loyal people for its bravest defenders, and Captain Prentiss retired to the quietude of home, though honored with the tender of an important post in the government service.

Soon after the new government was installed in their new position, Captain Prentiss set about reorganizing his military command, and when the proclamation of the President reached Illinois calling for volunteers, the requisition was met at once by the tender of a company of two hundred and five men from Quincy, under Captain Prentiss; the command was accepted, and within ten hours of the time when notice of their acceptance reached them, the Quincy Volunteers were *en route* for Cairo.

Upon the formation of the Seventh regiment, Captain Prentiss was unanimously elected colonel, and when the Cairo forces were organized into a brigade, he was chosen to the Brigadier-Generalship without a dissenting voice among the commissioned officers with whom he was associated, and he received his commission on the 10th of May, 1861.

He is only about five feet eight and a half inches in hight, slim built but muscular, rather angular features; has a mild gray eye, a very erect and soldierly carriage, and weighs about one hundred and forty-eight pounds.

He has raised a large family of children, is strictly temperate, and such is his robust constitution and regular habits, he scarcely knows by experience what sickness is. In conversation General Prentiss is affable and pleasant, has a fund of *recherche* sayings applicable to every occasion; loves liveliness, but scorns frivolity; is calm and cool under all circumstances; has a keen perception of human nature; is a strict disciplinarian, but has a way of making his subordinates do their duties without ostentation. If he has in his composition a "weakness" it is "benevolence"—he gives with a prodigal hand, and is proverbial for his acts of kindness to the poor.

The General is uneasy, and chafes at the necessity of remaining in Cairo; he wishes to be on the march down the river, but the powers at Washington hold him back. Cool, cautious, resolute, daring and intrepid, he combines all the essentials of a successful commander with the virtues of an honorable man; and such being his attributes, he is honored and loved alike by his officers and men, and those who know his excellence in private life.

Diseases of the Camp.

Recruits and young soldiers should never forget that those fatal diseases which attend armies, and make more havoc than the attacks of the enemy, are almost all preventable; though often spread by infection to older troops, they generally begin and are chiefly confined to those men who are inferior in experience or self-control, and take less care for cleanliness, temperance and proper clothing. The mortality which decimated our armies in the Mexican campaign was due, not so much to wounds received in action, as to fevers, dysentery, diarrhea, and the consequent weakness resulting from these maladies. Thus after the return of our brave troops to their native country, the diseases they had incurred pursued them like a relentless foe, and hurried them to an untimely grave long after they had been cheered by the sight of homes and friends.

During the last Russian war 16,211 men died by sickness, and only 1,761 by wounds in the various hospitals, and exclusive of those killed in action. In the French and Russian armies the difference is said to have been still greater. During the last six months of the campaign, in which the city was stormed and taken, the French hospitals received 21,957 wounded, and 101,128 cases of disease. In the disastrous expedition to Walcheren, in 1809, the British lost one-third of their fine army by disease, and only sixteen per cent by wounds. During the Peninsular campaigns of the Duke of Wellington the losses by wounds were about four per cent, while nearly twelve per cent of the troops were carried off by disease.

These facts show the paramount importance of such preventive measures as experience has proved protective to health. Among these are proper ventilation, scrupulous personal cleanliness, the wearing of flannel next the skin, the moderate use of fresh vegetables and fruits, especially oranges and lemons; regular rations, and partial or complete abstinence from spirits. It is also necessary to separate the sick from their healthy comrades. Scarcely any arrangement can be named more important than this; and universal experience has shown that the crowding together of the sick and wounded is one of the worst calamities that can befall them. The slightest attacks of disease are thus aggravated; and, becoming epidemic, have often caused a fearful loss of life, which, under judicious regulations, might have probably been altogether prevented.

The Confederate Loan.

The loan of the Confederate States, which "was all taken at par" almost before the books were opened, if we could credit the secession press, Macawber like, it turns up again, and is begging somebody to "come and take me." The *Jacksonian Mississippi* appeals "to patriotic citizens to come forward and invest in this most desirable stock." "The time has come," it says, "for men to use the money they have been laying up against a rainy day. Planters of the South, we entreat you by all you hold dear in this life, and by all the hopes you have for your posterity, to open your purses and drain them to the last dollar, rather than the government should suffer for want of pecuniary aid to defend your liberties. Better, far better, were it to sacrifice your whole property and leave your children poor, but free, than that the vigor of our operations should be paralyzed for want of money." This loan is to support the blessed government of Mr. Davis.

A VALUABLE LEGACY.—As the hour approached when the eyes of the late Senator Douglas were about to close in death, his mind and energies sparkled up, for a few moments, in order that he might impart to the dearest objects he was about to leave behind him the result of the political experience of a lifetime. When asked by Mrs. Douglas what message he wished to send to his sons, he replied with the clear emphatic voice of earlier days, "Tell them to obey the laws and support the constitution of the United States." Such words should sink into the hearts not only of his bereaved children, but of every true patriot in the land.

New Orleans Bankrupt.

Nothing works out the destruction of the material interests of a people so rapidly as war, especially if the expenditure obtains supplies from foreign sources. Thus, while all sections of our common country feel the pressure, it falls especially heavy upon the agricultural States of the South. They have been obliged almost entirely to purchase their supplies for this unnecessary rebellion, away from home, with the cash down. We are therefore not surprised to hear that bankruptcy has overtaken them.

New Orleans, as we learn from late New Orleans papers, is a bankrupt city. At a meeting of the Board of Aldermen, on the 15th ult., the Chairman of the Finance Committee stated to the Board that "the city was dead broke, and that he could not see financial daylight." Another Alderman, of large property, resigned his seat, and the Finance Committee reported in favor of suspending all new works, to relieve the finances of the city in that quarter. The *Delta*, commenting on the city's admitted bankruptcy, exposes another source of anxiety. A large number of tax payers, it says, are at the present time "utterly destitute of the means necessary to pay taxes on their small property," and should the time for payment not be extended, many will be compelled "to allow their homesteads to pass under the hammer of the Sheriff."

The *Delta* alleges that the bankruptcy of the city, though "little over four months of this year have passed," is largely owing to expenditures in furthering the military movements set on foot since the secession of the State.

A sad picture, indeed. The recently flourishing city of New Orleans is prostrate, her credit and business destroyed the inevitable result of secession.

Health of General Scott.

This great man, now at the head of our armies, is the object of profound interest, not only to the loyal citizens of the United States, but also to those who are making war upon the government. General Beauregard refers to General Scott as an "octogenarian," and intimates that none but fools can doubt the success of the Confederates. When the sham news of General Scott's resignation was reported in the South, the people there manifested the wildest enthusiasm, and one of the Richmond papers was rejoicing over the fact that the army of the South was to be led on by the commanding form of General Scott, &c. Now he is the "worst traitor that ever lived," and too old to be feared. A correspondent of the Boston *Advertiser* has recently visited the Lieutanant-General and reports thus:—

"On Sunday I had the pleasure of an interview, in company with a friend, with General Scott. So much has been said of his health that I am happy to be able to speak authoritatively upon the subject. Our interview was of at least an hour, and in the course of it I said to him that everybody felt a deep interest in his preservation, and I begged to know what I might report when I reached home, as to his health. He said that some time ago he received a fall in passing down a stairway, by which his limbs were partially paralyzed by a blow upon his spine, and that he rose and walked with some little difficulty; but that beside that his health was excellent. And I can add that if a free, brisk, unembarrassed conversation of an hour, upon a great variety of topics, can furnish any test of quickness and vigor of intellect, the country has no cause to apprehend that the General is not as capable to plan and carry out a campaign as when he started on his memorable march from Vera Cruz to Mexico. With such a man to plan, and with such men to execute, it only needs time to mature and provide for the discipline and wants of the troops, to plant the 'Stars and Stripes' again upon every fort, custom-house and navy yard in the circuit of rebellion."

FLOYD—This accomplished robber of arsenals and plunderer of government securities, is now endeavoring to raise a brigade in Virginia for the war, thereby securing a Brigadier-Generalship in the Confederate army. His consummate tact in robbing arsenals suggests him as a suitable person to undertake to rob United States troops of their arms. His right to do this latter job will be vigorously disputed, and if Floyd don't look out for himself he may get a slight peppering from some of those muskets which he so freely dealt in much to his dishonor.

ABOUT two million feet of lumber went over the dam at Manchester, N. H., Tuesday night. This is the greatest run of logs ever known on Amoskeag falls.

THE island of Manhattan, on which New York now stands, was bought of the Indians by Peter Minuits, the first Dutch Governor, in 1626, for twenty-four dollars.

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Conservation of Force in Nature—Mowing Machines.

A very interesting lecture on this topic was lately delivered before the Royal Institution of Great Britain, by Professor Helmoltz, F.R.S., and it has been published in the *Chemical News*. We find several interesting paragraphs in it relating to the science of mechanics. He stated that the most important progress in natural philosophy, by which the present century is distinguished, has been the discovery of a general law which rules all the branches of physics and chemistry. This law is of as much importance for the highest speculations on the nature of forces as for practical questions in the construction of machines. This law, according to Professor Rankine, might be called "the conservation of energy;" because it does not relate to intensity of force, but to the whole amount of power which can be gained by any natural process, and by which a certain amount of work can be done. Clocks and smaller machines and water wheels are moved by gravity, through a falling weight and falling water. The weight of a body, whether it is solid or fluid, which descends from a higher to a lower place is a motive power, and can be applied to every kind of mechanical work. The power of a weight to do work is measured by the product of the hight to which it is raised and the weight itself. A falling weight can raise another weight, and falling water can raise a hammer or weight expressed by its weight in pounds multiplied by the hight to which it is raised in feet. The amount of work is never greater than the product of the weight of water falling down and the hight to which it is raised. We have another form of motive power—that is velocity. The velocity of any body producing work is called its *vis viva*, or the living force of that body. We have an example of this in the ball of a gun. When shot off and has a great velocity, it has an immense power for destroying; when it has lost its velocity, it is harmless. Its destructive power depends upon its velocity. In the same sense the velocity of the air is motive power, and by it windmills are driven and mechanical work of various kinds performed. Therefore velocity in itself is a motive force.

If we take the elasticity of a bent spring, it can do work; it moves clocks and watches. These springs are bent by the force of the human arm, and they become reservoirs of mechanical power, which is communicated to the wheels. The whole power conserved in a bent spring may be given out slowly, as in a clock; or quite suddenly, as when shot in a crossbow. The elasticity of the air as a power may be conserved, like a bent spring, by compression, and communicated suddenly to a ball to shoot it with great velocity, as in an air gun. The power is communicated to the ball in the form of *vis viva*. The elasticity of compressed gases is also the motive power of the steam engine; but in this case the vapor is compressed by the heat communicated from the fuel in the furnace. The equivalence of heat with motive power has been the subject of deep research, and has excited great interest. It has been proved that when heat produces mechanical work, a certain amount of it disappears. Heat, on the other hand, can also be produced by mechanical power, through the friction of surfaces and concussion of bodies. Iron can be highly heated by striking it with a hammer upon an anvil.

We measure mechanical work by foot-pounds, and the amount of heat we measure by the quantity of heat necessary for raising the temperature of water one degree. The quantity or unit of heat necessary to raise the temperature of a pound of water one degree Centigrade or Fahrenheit has been determined by Mr. Joule, of Manchester, England. The quantity of heat necessary for raising the temperature of a pound of water one degree Centigrade is equivalent to the mechanical work by which the same mass of water is raised to 1,389 feet; or for one degree Fahrenheit one pound of water is lifted through 772 feet. This is called Joule's equivalent. It has been thus proved that heat cannot be ponderable matter, because it can be converted into mechanical power. In the steam engine heat is the origin of the power, but the heat is produced by burning fuel; therefore the origin of the motive power is in the fuel, or rather in the chemical forces of the fuel and the oxygen with which it combines during combustion. Chemical forces can therefore produce mechanical work which can be measured by the same units as any other mechanical force. We may consider the chemical forces as attractions, as the attraction of the carbon of the fuel for the oxygen of the air produces heat, just as the attraction of the earth produces work by attracting a body such as a weight or falling water. The energy of every force in nature may be measured by foot-pounds, and the energy of the whole system of bodies not under the influence of an exterior body must be constant; it cannot be lessened or increased by change. The whole universe represents such a system of bodies endowed with different sorts of forces or energy, therefore the amount of working power or energy in the whole universe must remain the same; it is unalterable.

What "a Gentleman" has Done since April 12th, as per Telegraphic Reports.

Saw Beauregard's funeral at Charleston; saw Jeff. Davis, April 19th, within twenty-four hours' march of Washington, at the head of the Confederate army; found out that Houston was to speak at Galveston in opposition to Lincoln; went to Philadelphia, April 23, and said Fort Pickens had been taken with serious loss of life; went to Baltimore and denied it; thence to Washington and reaffirmed it; met Beauregard in Norfolk same day; saw 6,000 troops at Harper's Ferry, May 6; same day saw only 4,000 there; saw Mr. Douglas' commission as Major General May 14th; knew positively that Washington's bones were stolen May 15th; May 16th, told Colonel Anderson on a railroad train that Breckinridge intended to join him; found General Scott very feeble, May 20th; never stronger, May 21st; May 27th, had no doubt General Beauregard was marching on Alexandria with a large force; May 29th, met Beauregard at Memphis; June 2d, saw Colonel Kelly killed at Phillippi; June 3d, found him alive; June 4th, saw a company of a Troy regiment captured; June 5th—didn't see it in that light.

In reference to General Beauregard, he is certainly the most ubiquitous person of whom history gives any account. One day he is dead and buried; the next day he is alive and kicking; the next day he is at Charleston; the next day he is in command at Norfolk; the next day he was at Manassas; the next day he is in Tennessee; and, at last accounts, was walking around the streets of Washington, looking at the "octogenarian" who is commanding the army of the Constitution. What is the matter with Mr. Beauregard, that he should be watched so closely? He went to Charleston some time in April, and at the head of 10,000 troops, well armed and full of fight, succeeded in partially conquering a starving garrison of some 70 or 80 men. Beauregard may be a wonderful man; but, thus far, we "don't see it."

The Army Worm.

We learn from several of our Western cotemporaries that the army worm has appeared in different sections of Ohio, Kentucky, Indiana, and Illinois. As these creatures come in immense armies, they are very destructive to the hay, corn and wheat crops. A correspondent gives the following method of arresting their advance. He says;—"Take the plow and run several deep furrows across their line of march, and let the sides of the furrows he left almost perpendicular. When the soil dries loose and the worms crawl up out of the furrows, they immediately fall back again in great numbers, and by strewing straw in the furrows and setting it on fire, myriads of them may he thus destroyed."

This is indeed a simple method of destroying them if it is as efficacious as thus represeuted. We understand, however, that this worm is developed in the soil of the very fields which they attack, and since this is the case, we do not think the plan proposed can be effective. If any of our readers know of any means by which these pests may be annihilated without destroying the product on which they prey, it is his duty to make it known far and wide.

MAJOR-GENERAL BANKS has been ordered to the command at Baltimore, succeeding General Cadwallader, who is ordered to advance toward Harper's Ferry. General Cooper has two regiments of Maryland volunteers encamped near Baltimore.

THE Memphis *Bulletin* reports that the yellow fever has made its appearance in New Orleans at this early date. This indicates that it may become terribly destructive before the season closes. A sad thought, truly.

IMPORTANT EXPERIMENTS.

An experimental vessel called the *Trusty* has been covered with thick iron plates, and exposed to solid shot from Armstrong and Whitworth rifled cannon. The London *Engineer* gives the result of these experiments. On the first day four shots were fired at 400 yards distance with Armstrong 80-pounders, and each broke the plating so as to expose the inner lining of wood. The fifth shot did not penetrate; the sixth was a bolt of puddled steel weighing 88 lbs.; it penetrated the plate and passed in a slanting direction to an upper deck beam, where it was broken into several pieces. Ten shots were fired at this distance, two of which missed, but all the others broke the outer plates, yet did little damage to the interior lining.

On the second days' firing, the distance was 200 yards with an Armstrong 100-pound iron conical bolt for the three first shots. The first started a plate half an inch at one end; the second fractured a plate the whole of its length; the third struck a joint and passed completely through the plates, opening the joint three-fourths of an inch. The fourth was a bolt of homogeneous metal (fine steel), weighing 80 lbs. It struck the started joint of the plates, passed through it, struck an iron knee, tore it away, and drove a piece of the iron plate into the water way on the opposite side. The next shot was a 100-lb bolt of homogeneous metal. It forced in a piece of plate 19 inches long and 17 inches broad, to a depth of 8½ inches. Nine shots were fired, one of which missed. They either broke or greatly damaged the plates, but the inner planking of oak, 25 inches thick, was little injured.

Only four shots were fired by Whitworth's gun. Each bolt was formed of homogeneous metal, hexagonal in form, flat headed, and weighing 79 lbs. The first passed through the iron plating 4½ inches thick, and buried itself 11 inches within the wood behind. The second passed through both the plating and the thick timber lining inside, carried away part of an iron knee, and drove a piece of the outer plating half way across the ship. The third shot passed through one of the ports; the fourth cracked a plate, pierced it, and destroyed part of the upper deck water way, but it did not enter into the ship.

It was found that the second shot of the Whitworth cannon, which was the only one which penetrated into the inside of the ship, passed through part of a plate that was unsound, and the wood through which it entered was also defective. Whitworth's cannon had the greatest penetrating power.

From these experiments with the most powerful rifled guns and solid shot, at 200 yards distance, 4½-inch iron plates, having a thick backing of wood, afforded immunity from danger to those on board, although the plates were greatly injured by the firing. One of these iron-plated frigates could pass all the batteries between New York city and the ocean without serious injury, and present her broad side along one of our docks. Shells, which are the most destructive missiles that can be thrown against wooden ships, splinter into fragments when they strike the sides of an iron-plated frigate. Some effective measures ought to be taken at an early date to build some iron-plated steam frigates and gun boats for the American navy. One of sueh iron-clad vessels can be constructed in New York within six months, and we think there can be no doubt but Congress, when it meets, will order the construction of one or more of them.

The Hair Worm Question Settled.

Our readers will remember the several letters which have appeared in our columns on hair worms, and how unsatisfactory the matter was left. Dr. R. P. Stevens, of this city, has just brought to our notice an essay on human testoides, by Dr. Weinland, in which the hair worm is described in a note. It is there stated that hair worms comprehend two families—the common horse hair worm (gordiacea) and the mermidacea or tender white worm, which the plowman often finds in rich soil entangled in bunches. The female gordius deposits millions of eggs in water. and the embryo which are hatched in no way resemble their parents. This larva penetrates into water insects. The young hair-like gordius is found in beetles, which they ultimately leave; and when they reach a ditch of rain water or a spring, their final development goes on.

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RECENT AMERICAN INVENTIONS.

Pail Can.—This invention consists in a certain construction and mode of applying, securing and sealing the head of the can, whereby, though it is hermetically sealed for transportation, provision is afforded for its easy removal when the paint or other contents of the can are to be used, and for its use as a lid, while the can is subsequently used as a pail. The assignees of this invention are Messrs. Reynolds, Devoe & Pratt, extensive manufacturers and importers of paints, oils and artists' materials. Office No. 108 Fulton street, New York city.

Roofing.—Various plans have been devised for laying slate roofs in order to overcome two difficulties; 1st, the breaking or fracturing of the slate in winter, due to the freezing of the water which lodges in the interstices; and 2nd, the sagging or settling of the roof, and consequent parting of joints and leakage, a result due to the weight of the slate. The first mentioned difficulty has been overcome, by laying the slate in cement, without lapping the slabs, thereby allowing no joints or interstices for water to lodge in. The second difficulty, however, has not been hitherto obviated. The slate when first laid in the ordinary way makes an excellent tight roof, the cements that are used forming water-tight joints, but inelastic or unyielding ones, and consequently on the sagging or settling of the roof, which soon occurs, the joints crack or batter the cement, and the roof is not weather proof. The object of this invention is to obviate these difficulties, and to this end elastic joints are formed, whereby the same are allowed to yield or give to compensate for the sagging or settling of the roof, and at the same time remain perfectly water-tight. The inventor is J. S. Sammons, of New York city.

Let-Off for Power Looms.—This invention consists in certain improved means of communicating to the yarn beam a positive motion, which shall be so controlled by the tension of the yarn, that the letting-off of the yarn shall be so regulated as to insure the weaving any number of picks to the inch that may be desired under all conditions, such means being also capable of ready adjustment, to vary the number of picks and possessing other advantages. Rensselaer Reynolds, of Stockport, N. Y., is the inventor.

Cannon.—In the use of an ordinary muzzle-loading cannon, especially if the same is fired rapidly, it is essential that the touchhole be closed perfectly air-tight after each discharge, and before a new charge is introduced, because whenever some atmospheric air is permitted to find its way through the touchhole into the barrel, the fresh charge is liable to ignite prematurely to the great danger of the man engaged in driving home the charge. The man who has to thumb the touchhole may be inexperienced in the performance, or he may by accident or carelessness forget or omit to put on the thick glove or thumb case commonly used, or his glove may be burnt or worn out, so that he is unable to perfectly close the vent. This invention consists in arranging a hinged spring pad in such close relation to the touchhole of a cannon, that by turning down said pad the vent is effectually closed, and accidental or premature discharge of the cannon is prevented. J. J. Hischbühl, of Louisville, Ky., is the inventor.

Improved Carriage Spring.

It seems to us that the invention here illustrated bids fair to prove one of the great prizes which an inventor occasionally reaps. It is a carriage spring of such a character that the weight pressing a carriage down on one side depresses the opposite also, thus keeping the vehicle level at all times. Besides this great advantage, the spring has also another advantage which ought to give a fortune to the inventor. It is not only peculiarly simple and light itself, but it is fastened to the axletree and body of the vehicle in such a manner as to allow of quite a material reduction in the weight of the carriage.

The spring consists of a single leaf or bar of steel, *a*, Fig. 1, which may be stiffened, if necessary, by additional leaves at the ends, as shown. It is fastened to the axle, *c*, by means of the supports, *b b*, being connected with these supports by hinged joints, *d d*, which are more fully shown in Fig. 2. The spring is firmly secured by bolts and nuts to the upper part of the hinge, so that it cannot slip, the hinge allowing it to work with very little friction.

As one end of the spring is pressed down the middle is pried up, thus carrying down the opposite end also, and keeping the carriage level.

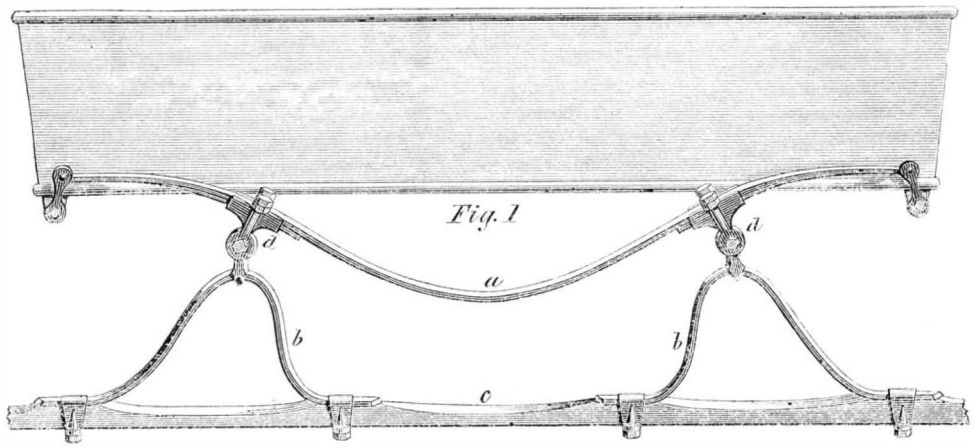

Fig. 1

PHILIPS' CARRIAGE SPRING.

The inventor, who was at our office a few days ago, informs us that he has already sold rights to the amount of $2,300 for territory in his vicinity, and that the great carriage-makers in this vicinity manifest great interest in his improvement.

The patent for this invention was secured through the Scientific American Patent Agency on the 26th of March, 1861, and further information in relation to it may be obtained by addressing the inventor, Thomas Philips, at Ann Arbor, Mich.

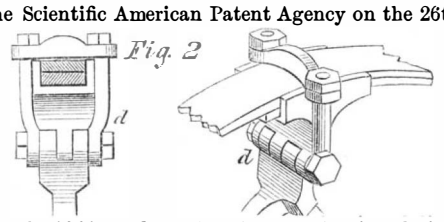

Fig. 2

HOW PERCUSSION CAPS ARE MADE.

The invention of percussion locks for firearms was as great an improvement upon the flint lock as the latter was upon the old match lock. Its inventor was a pious man devoted to the arts of peace—a Presbyterian minister—whose name and the date of whose patent are recorded on page 340, current volume of the Scientific American. The percussion powder was first fed into a small cup in the nipple; this was struck by the hammer and ignited the charge. The inventor of percussion caps is alleged to be Joseph Manton, an Englishman, who took out a patent in 1818. His first caps were made of small copper cups charged with percussion powder similar to those still in use. Other parties soon tried to obviate his patent by using small copper discs charged with percussion powder, but these were held to be covered by the patent. The cap was a great improvement upon the loose charge of a pellet of percussion powder placed in the nipple, and all firearms, except those furnished with Maynard's primer, or explosive cartridges, are adapted for percussion caps. An account of the manufacture of percussion caps will be interesting and instructive, especially as no clear description of the operations has hitherto been published, as far as we know.

Percussion caps are formed of a soft copper alloy, which is principally obtained from France in the form of thin sheets. The first operation is cutting these sheets into narrow strips with roller shears. The next is punching out the blank caps, and striking them up in dies in a machine. The strips of copper are fed in between small rollers over a small table which has four dies in it. A punch comes down, and at each stroke cuts out four blanks in a row from the strip. Each blank is formed like a Maltese cross, and just as it is cut out, a small round plunger pin strikes it in the middle, forces it into a small conical die in the table below, and thus forms it into a cap. At the very instant the small die plungers are raised, a puff of wind from a blower throws the four caps out of the dies into a receiving box, and the dies are ready for upsetting another set of blanks. Sufficient copper is left in the strips after punching to enable them to be carried forward to clear the table at each stroke. Different dies are employed for caps of different forms.

The next operation is that of charging and stamping the caps. For this purpose, a strong steel plate containing about 1,000 small conical holes or dies to receive as many formed caps is used; it is laid upon the table of another small machine, a girl takes several handful of caps from the box of the die press, spreads them over the steel plate, and by a few rapid motions of the hand, they all sink into the holes with open mouths, ready for the percussion powder. This is a compound of fulminating mercury, of potash, sulphur, and a little ground glass. This is spread dry and loosely by hand, like meal, over the entire plate, and each cap is filled to the mouth. The surplus is then swept off with a brush from the surface of the plate. Tin foil is now laid upon the top of the plate covering the powder in the caps. A series of small plungers, each of such a size as to fit into a cap, are now forced down upon the charged plate, cutting through the tin foil, and carrying a piece into each cap. The powder is pressed down by these plungers into a very small space at the bottom of each cap, and the pressure is sufficient to stamp the name or number on the top of each, by forcing the metal into the proper figure cut in the bottom of each hole. The pressure to which the percussion powder is subjected by this operation is so great, that strangers are always surprised on witnessing it. Sometimes caps explode by the pressure, but as the plates are strong, no damage of any consequence results.

The next operation is that of coating the inside of the caps with varnish to render them waterproof and prevent access of the atmosphere to the powder. For this purpose the plate containing the caps is placed in another machine, which has a series of little dippers, that take up the varnish from a receptacle, and supply each cap with its proper quantity. The plate containing the caps is now removed into a warm room, when the varnish dries, and the caps are then emptied out of the plates, and put up for market. Quite a number of steel die plates are employed in the process, and a set of small machines required for the entire operations of cutting the copper, punching, upsetting, charging and varnishing; will make about 400,000 caps per diem.

We have described the operations from the beginning to the finishing of one set of caps. Several sets of machines are generally run in every percussion cap factory. The demand for such caps has been so great for several weeks past, that the factories have scarcely been able to meet it by working over hours. Some caps are made with top flanges, some are perfectly smooth, and without rims, and others are corrugated. These forms are all produced by the die machine.

MACHINERY OF THE PATENT OFFICE.

The derangement of the mechanical movements at the Patent Office alluded to in our last number are being put in order under the skillful engineership of Commissioner Holloway, and we are happy to state that the engrossing and mailing departments, of which we had occasion to specially complain, are again restored to systematic order. As an evidence of an improvement in these two departments, we refer to the lists of claims for two weeks on other pages; and we would add that we are in possession of still another list (those of the issue of June 4th), which came to hand just as the paper was going to press. They will appear in our next issue, accompanied probably with the claims of patents issued on the 11th inst.

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VOL. IV. NO 25.....[NEW SERIES.]....*Seventeenth Year.*

NEW YORK, SATURDAY, JUNE 22, 1861.

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IMPORTANT TO OUR SUBSCRIBERS.

With our next number closes the present volume of the SCIENTIFIC AMERICAN. We began the year with peace and plenty smiling upon the land, though not free from the mutterings of the storm that has burst upon the republic. We close our volume upon a sad, yet thrilling page of history—when the nation reels and groans under the shock of civil commotion. The statesman is puzzled, while the soldier siezes his gun and rushes to the defence of the flag, and every man is astir with the cause that ought to be dear to every patriot's heart. It is no time to be idle; it is no time to "sleep dull sleep." The mechanic and the inventor are called upon to renewed action, for without their combined power, our armies and our republic would be swept from the face of the earth. A Southern journal in speaking of the energy of the government, says :—

"A glance over the columns of the SCIENTIFIC AMERICAN shows with what energy and genius the people of this country have within a few weeks directed their attention to warlike engines and projectiles. The new steam gunboats ordered by the United States will far exceed, in construction and machinery, those which the British government sent to the Crimea. A material for rifled and other cannon four times stronger than cast iron is found in puddled steel. Experiments in the employment of corrugated steel plates for ships show that with half the thickness of the plates employed in England and France ships may be rendered shot-proof."

In commencing a new volume it shall be our aim to keep pace with all that is done in naval and military science, and to furnish the latest and best intelligence, not only upon the arts and sciences in general, but we shall also keep a record of all the leading events connected with the war, so that our readers may feel assured that no item of material interest shall escape their attention.

We reluctantly touch upon another point. In consequence of the secession troubles, and the discontinuance of the mails in the seceded States, all our mail facilities in that section are cut off. We trust, threfore, that the friends of the SCIENTIFIC AMERICAN will remember this fact, and exert themselves to increase our circulation in the loyal States. We have many subscribers in all the States now owning allegiance to the government, and we earnestly call upon them to interest themselves in getting a few additional subscribers. Ten persons clubbing together can have the paper for $15, which is only $1.50 per year; and we shall be excused for saying that for so small a sum, the same amount of useful and interesting information cannot be obtained elsewhere.

We shall give our hearty support to the government against overthrow—not as politicians, but as loyal citizens—and shall freely express our views upon all subjects that will promote this result. We do not electrotype our paper, and those who mean to subscribe had better do so without delay, and thus secure the paper from the beginning of the volume.

FLAX AS A SUBSTITUTE FOR COTTON—A DELUSION.

Since the usual supply of cotton has been cut off by the blockade of the Southern ports, public attention has been considerably aroused to institute measures for obtaining a substitute for it. The Board of Trade in this city, at a recent meeting, discussed the subject at much length, and proposed the formation of an association for the development and application of flax to take the place of cotton in our manufactures. More zeal than knowledge distinguished the proceedings of the Board in relation to this question. If we cannot obtain cotton for our manufactures, of course we must have something else; but in the present state of the arts flax cannot be produced as a cheap substitute for it. The public should be made aware of this fact, so that there may be no delusion on this important question. We shall endeavor to make this perfectly clear.

The fiber of cotton exists free in the ball as it is picked from the plant, and it only requires to be subjected to the simple mechanical operation of ginning to remove the seed, when it is fit for the first operations in the factory. Flax, on the other hand, requires to be rippled, or threshed, then retted, dried and skutched, involving several expensive chemical and mechanical operations, extending over a number of days, to put it into the condition obtained by the simple gin in the case of cotton. Flax grows like grass; it has a stalk with a pith or woody heart, and the fiber forms the sheath. This fiber is cemented with vegetable glue and bitumen, which have to be decomposed by the retting process before the pith can be removed and the fiber set free. Improved processes may be discovered to render the preparation of flax less expensive, but we cannot alter its nature; its preparation will always be more expensive, we think, than that of cotton.

At the present time, the prices of cotton in our market range from 11¼c. per pound for ordinary upland, to 15⅝c. per lb. for fair New Orleans. In ordinary peaceful times, the prices range about two cents less than the above. Flax, of an equal degree of fineness of fair cotton, is not an article commonly sold in our markets; but in Europe it is four times the price of cotton. Why, our common dressed American hemp, a coarse fiber of the flax species, is the same price as ordinary upland cotton, and Italian hemp is 11¼c. per pound by the tun.

Another mistaken idea has also been disseminated among the community, namely, that by reducing flax to what is called "flax cotton," it becomes a substitute for common cotton. The process of cottonizing flax consists in reducing it to short fiber by a combined chemical and mechanicial process.

Several years ago Chevalier Claussen produced considerable of a sensation in Europe in making flax cotton, by first steeping the flax in a strong solution of carbonate of soda, then in dilute sulphuric acid. The acid disengaged carbonic acid gas in the pores of the flax, and split the fibers into short staple. This process has been fairly tested in this country, but without pecuniary success. Several other parties besides Claussen have introduced peculiar modes of cottonizing flax; and the Lyman process, by subjecting it to high pressure steam first, then permitting it to expand suddenly, effects this object in a most simple and not expensive manner. But we cannot impress the fact too strongly upon the public mind that, in the preparation of flax for spinning, the cottonizing of it is the very thing which should be avoided. One of the valuable qualities of flax consists in its long fiber. This enables it to be spun upon proper machinery at less expense than cotton. It is, therefore, a mistaken notion to reduce the fiber of flax to a cotton condition to fit it for spinning on cotton machinery. The great expense connected with it is its preparation, and obtaining a long staple; and every attempt at improving the processes connected with its treatment should have special reference to prevent the cottonizing of it. We do not wish to discourage the cultivation of flax and the devolopment of its manufactures, but we consider it our duty to warn enthusiasts against the delusion of raising flax, and manufacturing it into goods to be sold at any thing like so cheap a price as cotton fabrics have been furnished during the last thirty years.

OUR FOREIGN RELATIONS.

Some apprehension has been felt among loyal citizens at the course of the British government toward the "Confederates," in acknowledging them as entitled to belligerent rights. The full force of this position would allow Jeff. Davis' privateers to take stolen vessels into British ports and have them condemned. Our people very naturally felt much indignation at this position of the British government, with whom we were at peace, as it would expose our commerce to sad havoc. No other government in Europe has shown so little sympathy for the United States government as Great Britain. We believe the people are with us, heart and soul; but love for the pounds, shillings and pence oftentimes puts a plaster over John Bull's right eye. England has acted hastily and wrongly in this matter, and, what is most provoking, is that the policy of that government was announced by royal proclamation before the arrival of the American Minister, Mr. Adams, who alone was authorized to represent the settled policy of our government. The latest advices from Europe are down to the 5th inst.

The most important item is a brief announcement that the *British government has decided not to allow the entry of prizes of privateers at any British port.* It is understood that Napoleon has expressed decided sympathy with our government, and will allow no sale of prizes in French ports, and no tarry there of privateers beyond 24 hours. Spain will obviously coincide with this policy, and that will shut the secession freebooters out of nearly every port but their own, and there our cruisers will take care of them.

Our government has just received a large number of despatches from all our foreign ministers, of a highly satisfactory character, as regards the state of feeling in Europe. From Belgium, the most positive assurances have been received that no Southern Confederacy could obtain recognition in any form. The London *Times*, which has been very clearly on the wrong side, now urges the necessity which exists for every man or party in England to avoid giving offence to either party. We trust that the *Times*, at least, will set a better example.

It is evident that Europe is impressed with the determined attitude of the loyal States, and we think no trouble can come from a foreign source.

THE revenue of the British government is £70,000,000 per annum. The tax per head is two pounds, six shillings and eight pence.

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IMPROVEMENTS IN CANNON.

There is great room for improvement in artillery, and it is important that the inventive faculty of the country should be directed to effecting desirable results, instead of being wasted, as it is to a great extent at present, in the pursuit of ends that have no value when they are reached.

In the first place, there is nothing gained by having cannon so constructed that they can be loaded with very great rapidity. The burning of so large a quantity of powder in the middle of a mass of iron rapidly heats the gun, so as to render it dangerous to introduce the powder unless time is allowed between the discharges for the metal to cool. There may, however, arise exigencies in battle when it would be very important to fire a *few times* in very rapid succession, even if the gun were so much heated as to be unfit for further use for the time.

The packing of the shot to close the windage, and to *center* the shot so that its axis shall coincide with the axis of the bore, is a very important matter, and is receiving a large share of the attention of inventors. This is effected perfectly in breech-loaders, and is the only advantage that we have yet been able to discover in this species of cannon. By making the shot with soft leaden bands around it—the circumference of these bands being greater than that of the bore—and having an enlarged chamber in the breech to receive the shot, when the powder is fired the shot is driven through the bore, swedging the bands into the riflings absolutely airtight. One great objection to lead for packing the shot, is that if the gun becomes the least rusted in the inside, the lead is scraped off, filling up the riflings and disabling the gun. Mr. Cochran thinks that pure copper is the best material for packing shot, and he employs two coils of copper wire, one near each end of the shot, for breech-loaders.

Many patents have been taken out for rings to be expanded by the force of the powder, so that the gun might be loaded from the muzzle, and the advantage of perfect closing of the windage might be obtained without the very serious objection of complicated structure that applies to breech-loaders. We suppose what is wanted is a packing of two rings, one near each end of the shot, to expand readily with the first force of the powder, to fill the riflings perfectly, to be sufficiently strong to turn the shot, and to be in no danger of flying off. When these several qualities have been secured, then the invention that gives the *simplest* shot will have the preference.

Another broad field for improvement is in the cleaning and lubricating of the gun. In dry weather, a mass of dirt accumulates in the bore, and interferes materially with accurate practice, especially with rifled cannon. In some practice with breech-loading small arms at Boston, sometime since, one of the competitors dipped each of his shot into a cup of oil before he put it into the gun, and he made over 100 shots without wiping his piece. There is no better lubricator than water, and if a metallic pipe filled with this fluid could be introduced among the packing in some way to burst with the discharge, and both wash out the gun and lubricate it at the same time, it would doubtless be desirable. Cartridges for breech-loading small arms are now made of very thin copper, and as the cartridge case is withdrawn after each discharge, it removes a considerable portion of the dirt with it. Can some plan be devised for withdrawing a similar cartridge case from muzzle-loading rifled cannon?

In all efforts to improve artillery, it must constantly be borne in mind that the first essential is *simplicity*. However great the advantages of any invention, if they are obtained at the sacrifice of this quality, they will must be worthless. The Whitworth cannon is about as simple a breech-loader as it is possible to conceive of; but, from the fact that it consists of four pieces of metal instead of one, it is not probable that it will ever supersede the muzzle-loading cannon. The Minié shot, for small arms, consists of one single piece of lead, and is therefore found suitable for use in actual warfare; if an expanding shot for rifled cannon could be devised of equal simplicity, it would doubtless have preference over all others.

THE London *Mechanics' Magazine* has stated that the initial velocity of round cannon shot, with common charges of powder, is 1,080 feet per second.

THE FOLLY OF APPOINTING CIVILIANS TO MILITARY COMMAND.

George Washingtan, in conducting the revolutionary war, was taught the great importance of having educated and trained officers for the guidance of armies, and he gladly accepted the services of Baron Steuben and other experienced military men from Europe, to aid him in organizing his forces and training his officers in their important duties. After the war, he recommended the establishment of a national school, for teaching a limited number of students military science and art, in order that the nation might never again find itself destitute of this peculiar knowledge, so essential for its defence. In 1802, this school was established at West Point, and has been in successful operation ever since. The students, who are limited to 250 in number, are educated wholly at the national expense. The course of instruction has recently been extended from four to five years, and the standard of education is very high, so high, indeed, that a large proportion of the cadets, though selected from the most intellectual part of the community, are unable to master the studies. Those who do graduate are, to say the least, fully equal, in the theoretical knowledge of their profession, to the military officers of any nation in the world.

The pay of our officers has been so small that many of them have been drawn into other pursuits; and it was only by means of their knowledge of engineering that the country was able to construct its unparalleled system of railroads. In 1837, Major McNeill was in the receipt of $5,000 a year each from seven different railroads, as chief-engineer, so rare was engineering science at that time. But those who have adhered to the service have had no other hopes in life than advancement in that service. The only thing that they look forward to is promotion, and this has been remarkably slow in our peaceful history. No words can tell how weary has been the waiting of many of these men. At last there is war! Now their slumbering knowledge will be made available, and they will reap the reward of their patient persistence. Captains will become majors, majors become colonels, and colonels, brigadier-generals. The officers take up the morning paper, and find that some pot-house politician has been made, at one bound, a brigadier-general over all their heads. We have no special sympathy with the officers of our army, but we feel the deep wrong and disgrace of the republic treating any of its servants with such unspeakable injustice.

The folly of this course is as great as its meanness. A regiment is a large body to be drawn from the pith and marrow of the community, and it costs about $1,000 a year to support each one of these 800 men. A brigadier-general has the guidance of several regiments, and to conduct them wisely requires a peculiar knowledge. The art of war is one of the most complicated and difficult of all arts. To trust the conduct of a brigade to a man who has never learned how to do it, is monstrous stupidity. It is wasting the resources of the country, and trifling with the lives of the men. And this is not the worst: it is exposing our forces to defeat and the nation to disgrace.

General Butler had exhibited peculiar military qualities of so high an order as fully to justify his appointment; and Governor Banks too had given proofs of executive abilities that would eminently fit him for the conduct of the commissary's department; but these appointments of civilians should form rare exceptions, and the rule should be to entrust the guidance of our valuable soldiers to that accomplished body of men who have been educated and trained to this peculiar service. With all respect, but with an earnestness proportioned to our interest in the national honor, we urge our military authorities to appoint no more mere politicians to important military commands. The government of the United States is engaged in suppressing a monstrous rebellion. It needs the coöperative support and sympathy of men, without regard to political bias. Thus far it has secured all this; but when we hear of the appointment of some small-beer politicians, totally ignorant of military knowledge, to important positions in the army, we feel that it is a wrong to the whole country. The brave Captain Doubleday, who heroically fought the enemy in Sumpter, is now leading his men on to Harper's Ferry, while no notice is taken of him by the government. Lieutenant Slemmer, who gallantly defied the secessionists at Fort Pickens, is merely a major, and Major Anderson is only a colonel; while some local politician is allowed to suddenly become an officer of equal rank. We are glad to see that the press is taking notice of this matter.

OUR ARMY COMMISSARIAT—BREAD.

The bravest and most patriotic soldiers in the world will become inefficient and dissatisfied if they do not receive a sufficient supply of food. During the American Revolution, Gen. Wayne's Brigade once revolted because they had not been provided with proper food and clothing. There was everything in those dark days which could be urged in extenuation of the Commissary Department in being unable to provide for the wants of the soldiers, because there were no funds with which to purchase the necessary food. It is far otherwise at the present moment, however; money is abundant, the country is full of provisions, and every facility is afforded by steamboat and railroad to supply each regiment in the United States with an abundance of the most healthy food every day. And yet, although this is quite true, we hear of frequent complaints from troops in camp and field who do not receive an adequate supply of food. This cannot be owing to a niggardly policy in paying for it, as we understand that ample expenditures have been made to furnish a plentiful supply. The cause of these evils, then, must be attributed to persons connected with the Commissariat, whose only patriotism in the hour of their country's peril, seems to consist in making money by robbing the soldiers of the food which justly belongs to them. Animals and insects which prey upon the food of man are universally held to be fit subjects for extermination; Napoleon used to act upon this principle in treating those connected with his commissary who defrauded his soldiers.

We are confident that all frauds connected with the commissary can be traced to their source, and it is the duty of the authorities in Washington, and those of the several States, who have charge of such affairs, to investigate this matter thoroughly, and remove every just cause of complaint.

There is one very important part of the food department which is not managed in accordance with the improvement of the times: we mean the bread provided for the soldiers. Hard crackers, requiring the jaw bones of a Goliah or an improved grist mill, to masticate, are the common bread-food in fort and field. Fresh bread can be provided just as easily as stale biscuit. During the war in the Crimea, Dr. Hamlin, the distinguished American missionary in Constantinople, was a contractor for supplying the British army with fresh bread, and for some time he furnished 20,000 loaves daily to an army scattered over a large area. His system was so excellent that he found little difficulty in manufacturing such a large supply. Such bread tended to keep the soldiers in good spirits, and in the last year of that campaign the health of the army in the field was much better than in the barracks of England.

In marked contrast to this, the French army, which was the best provided for at the beginning of the campaign, and therefore the most healthy, suffered severely by sickness during the last year. The French commissariat, either through great frauds in its management or an exhaustion of ability on the part of the government to sustain it, sunk into great disorder, while that of the English rather continually improved.

We direct attention to these facts because they are important guides to us now. The French commissariat did not furnish fresh bread nor plenty of it, while their compatriots in the field were provided with an abundance of it through an energetic and administrative honest Yankee. The chief officers of the government are responsible for the manner in which this department is conducted, and the utmost rigor should be egercised in connection with it. We have competent men and abundance of material in this country wherewith to organize and manage the best commissary in the world.

COL. RICHARD DELAFIELD is a highly honorable and loyal officer in the United States army, and is not a secessionist, as has been inadvertently stated in our paper and some others.

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Steam in Cultivation.

This is the great topic at present with English farmers. A paper "On the Forces used in Agriculture," recently read before the Society of Arts," by Mr. J. C. Morton, is exciting much discussion. The money value of power as exerted by steam, by horse and by man, is stated by Mr. Morton to be as follows: Steam can meet a certain continuous force at a cost of six cents per hour; the same, if supplied by horses, would cost 20 cents, and if supplied by manual labor, no less than $3.60 per hour. In the remarks which followed we are glad to perceive that the importance of improving the directing power—the English laborer—both as regards his physical and mental forces, was urged by every speaker. Professor Wilson, of the University of Edinburgh, remarked that—

To the laboring man steam has been and always will be a friend; it relieves him from the hardest and worst portion of his duties, and raises the value of his higher (mental) power—skilled labor. The industrial history of the country teems with evidence of the benefits conferred by steam machinery on the working classes, not less in increased employment than in increased wages for it; and few departments of industry offer greater opportunities for its development, than in that connected with the productive powers of the soil. But the machine, to be complete, needs the directing skill of the man. He is essentially one of its working parts; and as in mechanics it is an axiom that the strength of the whole is only equal to its weakest part, it is clear that the efficiency of the machinery we use materially depends upon the knowledge and skill with which it is directed. I cannot refrain from expressing a very strong opinion that our farmers will find it to be greatly to their interests in a pecuniary point of view, to say nothing of higher motives, to endeavor at once to improve the condition, both moral and physical, of their laborers, and prepare them for the new duties they will be expected to perform.

Troublesome House Insects.

As warm weather comes on, innumerable insects will wake from their winter nap, or emerge from the larva state, to enjoy their life at the expense of our comfort. The buzz of the fly will be answered by the tiny horn of the mosquito, the flea will skip nimbly over the floor, and the moth and chinch will stealthily hide in the carpet or the bedstead. Scrupulous cleanliness will thwart most of them. Flies are nature's scavengers, ever ready to convert putrifying matter into innoxious substances. Keep the yard free from decaying vegetables, refuse from the kitchen and the drain of the sink, and sweeten the out-buildings with lime, and they will mostly emigrate to promising quarters. The few stragglers which remain can be nearly excluded by frames covered with millinet placed in the windows when open. These will also keep out the vexatious mosquito. Myriads of these latter insects are often bred in swamp spots adjoining the dwelling. Proper draining will rout them at head-quarters. The rain water cistern is also prolific in mosquitoes: place a few lively minnows or other brook fish there, and they will fatten on the larva of the tormenting insect—thus the biter will be bitten.

The flea delights in the dust and litter of the wood-house and the wagon-shed. Remove all this, sprinkle fresh lime in its place, add whitewash to the beams and boards, and the fleas will soon vanish.

Take up all the carpets, beat them thoroughly with a slender rod, and scatter pepper around the sides of the room where the edges of the carpet are to be laid. Then, once a fortnight, whip the outside breadths upon the floor with a light switch, and the remaining moths will be beaten out.

The chinch or bed-bug can be routed by first washing all parts of the bedstead with cold water, and then, with a brush, applying corrosive sublimate dissolved in spirits, or an amalgam of lard and quicksilver rubbed together. Or ask your druggist for six cents' worth of unguentum; mix it with lamp oil, and apply it with a brush to all joints and crevices, when the bugs will sleep, and allow you to do the same.—*Farmer's Journal (Canada)*.

THE *American Medical Times* calls attention to the efficacy of creosote as a local application for diptheria. Ten drops of creosote to a gill of warm water is applied as a gargle; one or two applications effect a cure.

Herepath's Railway Journal says :—

On some lengthy railways, long opened, and extensive in business, there has never been any fatal accident, which sufficiently proves the natural safety of the railway system. With all our railway accidents, arising principally from mismanagement and train racing, only one passenger in about six and one half millions carried has been killed.

ISSUED FROM THE UNITED STATES PATENT OFFICE

FOR THE WEEK ENDING MAY 21, 1861.

Reported Officially for the Scientific American.

*** Pamphlets giving full particulars of the mode of applying for patents, under the new law which went into force March 4, 1861, specifying size of model required, and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

1,339.—M. L. Baker, of Milford, N. Y., for Improved Apparatus for Milking Cows:

I claim the two cylinders, A A′, provided with plungers, C C, sacks D D, and valves, a a′, c c, in combination with the tubes, B E, and the reservoir, F, with teat tubes, G, attached, all being arranged for joint operation, as set forth.

I further claim the valve, H, in the reservoir, F, arranged substantially as shown, to effect a ready attachment of the teat-tubes, G, from the teats of the animal, as set forth.

[This invention consists in the employment or use of two pumps arranged with a receiving chamber, valves, and conducting tubes, whereby cows may be milked with far greater facility than by the manual process, and the device readily detached from the teats of the cow, in case the latter should prove vicious or unmanageable.]

1,340.—Walter Baker, of West Winstead, Conn., for Improvement in Manufacture of Hoes:

I claim, as an improved article of manufacture, a hoe formed from a single piece of metal, in the manner substantially as shown and described.

1,341.—Roberts Bartholemew, of U.S. Army, for Improved Water-proof Cartridge:

I claim the within described solid water-proof cartridge, made in the manner and for the purpose herein specified.

1,342.—G. Beatty and C. Beatty, of Norwalk, Conn., for improvement in Apparatus for Forming Hat Bodies:

I claim the steam hat block, E, steam bed, D, and the clamps, G I, arranged for joint operation, substantially as and for the purpose set forth.

[The object of this invention is to obtain a machine for forming hat bodies from felt cloth in a very expeditious manner and by a very little labor or manipulation of the parts. The invention consists in the employment or use of an adjustable steam hat block in connection with a hollow steam bed and clamps, to operate in such a manner as to effect the desired result.]

1,343.—H. S. Bartholemew, of Bristol, Conn., for Improved Ball Brace:

I claim a ball brace, A′, made of a single straight rod, A, and with an undivided ball, B, fitted upon its bow-shaped portion, substantially as and for the purposes described.

1,344.—C. Bixler, of Rogersville, Ohio, for Improvement in Water Elevators:

I claim the combination of box, A, chamber, B, and valves, a and c, pipe, C, with the weighted piston, D, rod, E, rope or chain, g, shaft, h, gear wheels, i, and k, and crank shaft, m, all arranged in the manner and operating as a whole, for the purpose herein described and shown.

[This invention relates to a method of raising water and keeping the same under a pressure or head, whereby it is forced through pipes to any convenient place for service, whence it can be used at pleasure.]

1,345.—George Bruce, Sen., of Sing Sing, N. Y., for Improvement in Burglar Alarms:

I claim the combination, for the purpose specified, of the arms, D E, the upright, A, hammer, H, and "sere," K, with a fire-arm barrel, J, or a bell, or other alarm-sounding device, arranged to be operated by the hammer, substantially as set forth.

[The object of this invention is to obtain a device which will sound an alarm when an attempt is made to open a door, and at the same time serve as a fastening to prevent the door being illegitimately opened.]

1,346.—E. W. Bullard, of Barre, Mass., for Improvement in Machines for Turning and Spreading Hay:

I claim giving a number of forks, arranged to operate successively a backward and forward motion, by means of the crank shaft, or similar mechanism, when constructed and operating substantially in the manner and so as to accomplish the purposes set forth.

I also claim the prongs, P, when constructed as described and used in combination with the arms or forks, O, in the manner and for the purpose specified.

1,347.—A. S. Clark, of Dryden, N. Y., for Improved Sled-Brake:

I claim the combination of link, E, and beam, H, with the slotted arm, D, the whole being constructed and arranged as and for the purpose herein shown and described.

1,348.—W. C. Cook, of Appleton, Wis., for Improved Bed Spring:

I claim constructing the bed springs of loops, d, and links, a a b, formed of wire and connected together, as herein described and shown.

[An engraving of this invention will appear in these columns in a few weeks.]

1,349.—Robt. Cornelius, of Philadelphia, Pa., for Improvement in Electrophorus:

I claim the covering of the whole or a part of the face of the metallic plate, B, with leather or similar material, substantially as above described.

1,350.—Robert Cornelius, of Philadelphia, Pa., for Improved Frictional Electric Machine:

I claim, first, Applying the spring or adjusting screw, to the rubber outside of the case, and bringing the same into action through the case.

Second, The employment of the elastic backing for the rubber in combination with the metallic foil, placed between the back of the rubber and elastic cushion.

Third, The placing of the elastic cushion in a recess of the case, or in a metallic box made to fit in a recess in the case.

Fourth, The employment of the circular spring, k, in combination with the rubber.

Fifth, The combination of the adjusting screw, h, and the circular spring, k, arranged and operated as above described.

Sixth, Attaching the leather facing of the rubber directly to the facing.

Seventh, The manner of constructing and attaching the collecting piece, o, between the two grooves in the box, substantially as above described.

Eighth, The employment of a series of grooves around the surface of the disk for the purpose described.

1,351.—J. J. Crooke, of New York City, for Improvement in Manufacture of Tin Foils:

I claim the combined process, substantially as herein described for producing ribbons or webs of compound foil, viz., by first welding the lead and tin together, and then reducing in thickness by rolling. Secondly, by trimming the edges and shearing off the exposed lead, and thirdly, by reducing the trimmed sheets or ribbons into webs or ribbons of foil, by rolling, each of these steps of the process, and the precess as a whole, being substantially such as herein before set forth.

1,352.—H. G. Crowell, of Roxbury, Mass., for Improvement in Pumps:

I claim the combination and arrangement of the cam wheel, C, arms, E and F, connecting strip, G, ropes or chains, J and K, pulleys, I, L and M, and pump brake, or lever, S, substantially as and for the purpose described.

1,353.—Calvin Cutler, of Tonawanda, N. Y., for Improved Device for Hiving Bees:

I claim the above described swarm-catcher when attached to a bee hive and constructed and operating in the manner and for the purpose set forth.

1,354.—W. Freeman, of Mount Carmel, Conn., for improvement in Lamps:

I claim, in connection with the draught passages, B B, and ring, E, provided with the deflector, H, the guards or flaps, c c, placed over the openings or perforations, b b, to operate as and for the purpose set set forth.

[The object of this invention is to obtain a simple and portable lamp for burning coal oils—one that may be economically constructed and carried about from place to place equally as well as lamps for burning other materials which do not require a glass chimney to insure proper combustion.]

1,355.—Samuel Fulton, of Conshohocken, Pa., for Improvement in Casting Pipe:

I claim, first, forming molds for casting pipes by drawing up vertically through a proper flask, A, a pattern, B, while the sand is being poured into the flask, the pattern being formed substantially as described, so as to compress the sand without any ramming or other treatment thereof.

Second, Forming the flask, A, of three parts, a, b and c, the part a being smooth, and the parts, b and c, provided with internal rings or projections to operate as and for the purposes set forth.

Third, In connection with the two parts, a and b, of the flask, the ring, C, provided with the bead, k′, arranged as and for the purpose specified.

Fourth, The boss patterns, m, when inserted through slides, l, in the sides of the flask and adjusted to the pattern, B, as and for the purpose set forth.

[The object of this invention is to avoid the manipulation, and consequent time and labor, hitherto required in forming molds for casting small metal pipes.]

1,356.—R. A. Goodyear and L.A. Sprague, of Binghamton, N. Y., for Improvement in Skates:

I claim a skate that has the runner and foot stand connected by jointed arms, D E, with elastic material, G′, between the arms and the foot-stand, and otherwise made substantially as herein shown and described.

[The object of this invention and improvement in skates is to obtain a vertical yielding and elastic motion of the foot stand, and, at the same time, to preserve a parallelism between the runner and foot stand, thereby obviating the objectionable features of spring skates hitherto used—such, for instance, as the tipping of the foot stand of the skate, and the uniform action of the springs at the heel and toe of the skate and the straining of the feet and the liability of the springs breaking.]

1,357.—H. A. Hall, of Boston, Mass., for Improved Portable Filter.

I claim a portable filter constructed of an india rubber tube, A, perforated cap, B, neck, a, flexible tube, C, and mouth piece, D, as herein described and shown.

[See engraving on page 308 of this volume.]

1,358.—Charles Harasythy, of San Francisco, Cal., for Improvement in Portable Water Gas Apparatus.

I claim the combination of the cylinders, e e, with the retort, F, boiler, b, and tube, g, in connection with a stove used to produce gas as well as for heating, cooking and baking, substantially as described and for the uses and purposes set forth.

1,359.—C. Y. Heackler, of Philadelphia, Pa., for Improvement in Copying Presses:

I claim, first, The base, A, the overhanging arm, B, platen, C, and the lever, D, or other equivalent device for applying pressure to the platen, the whole being arranged substantially as set forth for the purpose specified.

Second, I claim the bell crank lever, D, hung to the overhanging arm, B, and provided with a roller, f, in combination with the platen, C, its projection, d, and elongated opening for the reception of the pin which hinges the platen to the arm, B, the whole being arranged substantially as and for the purpose herein set forth.

Third, The lever, D, with its projecting pins, j, in combination with the platen, its projections, E and E′, and the lips, m m, of the latter, the whole being arranged substantially as and for the purpose herein specified.

Fourth, The adjustable wedge formed plate, h, applied to the platen, and arranged in respect to the roller, f, of the lever, D, as described for the purpose herein set forth.

Fifth, The pin, x, on the lever, D, when arranged in respect to the orifice, y, in the end of the overhanging arm, B, as described.

1,360.—F. L. Hedenberg, of New York City, for Improved Fire-Place Heater:

I claim the open grate, the draft plate, the extension flue, the drum and air space between it, and the back plate, and the connecting passages, when arranged and operating together, substantially as herein described, and for the purpose set forth.

1,361.—W. C. Hicks, of Boston, Mass., for Improved Blind Fastening:

I claim the within described blind fastening, consisting of the spring, C, united to the two halves of the blind, as set forth, for the purpose specified.

1,362.—G. W. Hildreth, of Lockport, N. Y., for Improvement in Cultivators:

I claim the double slide irons, F F′, or their equivalents, with the horizontal slide irons, when used to form a triangular contracting or expanding truss for strengthening the cultivator, as herein set forth.

1,363.—T. P. Hornbrook, of Wheeling, Va., for Improvement in Bee Hives:

I claim enclosing the whole hive, when constructed and arranged as herein specified, within an outer case, in combination with the detachable feed trough attached to the door of the outer case, the several parts being arranged as and for the purposes specified.

1,364.—G. H. Horstman, of Philadelphia, Pa., for Improved Dust Pan:

I claim, first, the pan, A, comprising the tray, a, and reservoir, b, when combined with such a stem that the pan can be removed from place to place, without the necessity of stooping to the extent required in handling ordinary dust pans.

Second, The pan, A, formed and constructed substantially as described, its lid, e, elevated stem, D, and the devices herein described, or their equivalents, for operating the said lid, in the manner and for the purpose herein specified.

1,365.—T. W. Hoskings, of Detroit, Mich., for an Improved Machine for the Application of Man-Power:

I claim suspending the frame, I I, to the periphery of the main wheel, when the said frame is combined with the platform, Q, and with the gearing wheels, M, M, K K, and L, and when the main wheel, A, is connected with the pulley, G, through a system of gearing wheels, B, C, and D, in the manner herein set forth.

1,366.—G. C. Howard, of Philadelphia, Pa., for Improvement in Machines for Punching and Perforating Paper, &c.:

I claim, first, the endless band, i, the table, B, and vibrating roller, S, arranged in respect to the perforating, cutting or puncturing rollers, P and Q, substantially as set forth, for the purpose of presenting a sheet of paper or other material, to the said rollers.

Second, In combination with the said perforating, cutting or puncturing rollers, I claim the line, w, arranged above the table, B, sub

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stantially as set forth, for the purpose of adjusting the sheet of paper or other material, to a proper position, prior to being subjected to the action of the rollers.

Third, The treadle, l, or its equivalent, in combination with the strap guide. b, and vibrating roller, S, and the devices herein described, or their equivalents, whereby the depression of the said treadle allows the roller, S, to fall in the first instance, the further depression operating the strap guide, as set forth, for the purpose specified,

Fourth, Constructing the roller, P, with a recess in the face for the reception of the annular plate, p, and with a flange, q, having counter-sunk holes for the reception of the pins or punches, y, as and for the purpose herein set forth.

Fifth, The under roller, Q, having a thin periphery with holes, for the reception of the punches of the upper roller and the internal strengthening flange, v, as described.

1,367.—J. H. Jennings, of New Bedford, Mass., for an Improvement in Calks for Horseshoes:

I claim the described application of the calk to the shoe, viz: by means not only of a flanch and a pivot screw, attached to and projecting from the calk, and with the latter screwed into the shoe, but by one or more key screws, extended through the calk flanch and into the shoe and made substantially as specified.

1,368.—John Jones, of New York City, and A. K. Rider, of Poultney, Vt., for an Improvement in Rotary Pumps:

The two rotary disks constructed with radial and tapering cogs engaging with each other as described and shown, and arranged in different planes within a tight casing, which is separated into two concentric chambers by divisions, b b′, substantially as and for the purposes set forth

[This invention is a rotary force pump, wherein a continued rotary motion of two co ged disks, inclosed within a tight casing of a circular shape, are employed to produce the action, and also the forcing power of the pump.]

1,369.—G. W. Hirchhoffer, of Cincinnati, Ohio, for an Improvement in Apparatuses for Distilling Coal Oil:

I claim, first, In combination with the upright conical retort, D, the grinder, N O, when arranged to rotate in proximity with the heated surface of the retort, for the purpose of pulverizing the coal and securing the contact of the same, in a minutely divided state, with the heated surface of retort, substantially as specified.

Second, The arrangement of the upright retort, D, grinder, N O, and discharge pipe, a, for the purpose of permitting the pulverized and exhausted residuum to escape from the retort by its own gravity.

1,370.—J. C. Koch, of New York City, for an Improvement in Portfolios for Filing Music, Printed Matter, &c.:

I claim the round expanding back, in combination with the spear-shaped needles, stays, catches or fastenings and the flap or fall, the whole being constructed and operated in the manner and for the purpose substantially as described.

1,371.—J. S. Marsh, of Lewisburg, Pa., for an Improvement in Harvesters:

I claim, first, Combining with an automatic harvester rake and a harvester, devices substantially such as described, whereby the rake is caused automatically to ungear with the axle of the driving wheel, when the parts are adjusted to allow the driving wheel to make more than one revolution, for the purpose set forth, substantially as described.

Second, The arrangement of the angular rake head, E e e′, jointed at one end to a fixed standard, f, the crank, D, pitman, G, connecting link, F, traversing slide, H′, and guideway, H, for joint operation as described, and whereby the rake has the necessary movements upward in an inclining position, and back and forth, relatively to the platform, substantially as set forth.

Third, The combination with the hollow axle, A, of the driving wheel, of the sliding rod of the crankshaft, substantially in the manner and for the purpose described.

Fourth, Pivoting the lever, W, to the pulley, U, in combination with the flat spring, x, bearing against the pulley, U, and with the ratchet-toothed arc, R, and the short tongue, 3, in the manner described.

Fifth, The casting, L, forming the upper half of the box of the pinion shaft and the standard guide and stop, as described, in combination with the pinion shaft and with the lever, u, forming a clutch and a spring catch, in the manner and for the purpose described.

1,372.—T. J. Mayall, of Roxbury, Mass., for an Improvement in Ordnance:

I claim the arrangement described of supporting the gun barrel and its revolving cylinder so that the same may be swung round horizontally, and be raised, depressed and set at any desired angle with the horizon by means of a brace or frame extending under said barrel and cylinder, and being pivoted or hung on a stationary axle in suitable brackets fast on a plate, capable of horizontal rotation, substantially as shown and described.

The arrangement and application, substantially as described, with respect to the frame supporting the gun and the mechanism for automatically performing its functions, of the devices for pointing the gun in any desired direction, so that the latter may be effected simultaneously, independently of and without interfering with the operation of the former, substantially as shown and described.

I claim arranging the two shafts that receive and impart motion to the gun-operating mechanism, in such a manner that they shall be located within the vertical plane passing transversely through the center of gravity of the gun and its appurtenances, or thereabouts, whereby the gun may be operated with ease, substantially as shown and described.

Providing the rotary shaft, e, with a stud or projection, f, when so arranged as to actuate the spring clutch with which it is combined at every revolution of said shaft, and, at proper intervals of time, to release its hold on the breech, as set forth.

I claim the rotary shaft, e, and the stud or projection, j, when the same are combined with and arranged in relation to the breech-operating lever pawl to actuate the same to perform its functions, as shown and described.

1,373.—N. A. Menaar, of Buffalo, N. Y., for an Improvement in Railroad Signal Lanterns:

I claim the specific arrangement of the colored glass cylinder, A, the same being connected to its metallic bottom, B, with the spring, c, and slot, D, the said parts being arranged to operate relatively to each other, and to the supporting stand, lamp and globe of white glass, for the purposes as set forth.

1,374.—Mortimer Nelson, of New York City, for an Improvement in Balloons:

I claim, first, The employment with a balloon of one or more pairs of fans, e e, revolving in opposite directions, for the perposes and as specified.

Second, I claim arranging the shafts, f f, carrying the fans so that they can be inclined to the body of the car or balloon, for the purposes set forth.

Third, I claim the awning or parachute, b, arranged at a slight inclination in relation to the car or the movement of the balloon, and forming a buoyant sail, in combination with the fans or propellers, e e, for the purposes specified.

1,375.—W. D. Nichols, of Davenport, Iowa, for an Improved Device for Milking Cows:

I claim the elastic auxiliary piston, I, in combination with the actuating piston, D, and diaphragm, C, substantially as and for the purposes specified.

I also claim the combination of the levers, T T, with the top of the elastic compresser, S, for the purpose of easily adjusting the cups to the cow's teats, substantially as described.

1,376.—S. R. Parkhurst, of New York City, for an Improvement in Carding Machines:

I claim, first, The employment of a series of metallic strips or plates, with serrations on their edges, placed crosswise of each other, substantially as set forth, to form a feed roller or cylinder adapted to carding and similar machines, as specified.

Second, I claim in a carding or similar machine, forming the upper feed roller, c, with a series of ribs in the manner specified, for more effectually detaining lumps or foreign substances as they pass to a carding or toothed cylinder, so as to cause said lumps to be opened or operated as specified.

1,377.—Abraham Reese, of Pittsburg, Pa., for an Improved Bolt and Rivet Machine:

I claim, first, So constructing and arranging the heading tool and dies of bolt and rivet machines that the heading tool shall, during the entire operation of the machine, remain within the head cavity of the dies, substantially in the manner and for the purpose set forth.

Second, The use of fingers or rods entering suitable recesses in the face of dies, and so operated as to discharge the finished bolts and rivets from the dies, either by a positive or relative motion, substantially as described.

Third, Attaching the heading tool to its lever by means of a yoke or similar device, in combination with set screws or wedges, so as to regulate the thickness of the head of the bolt or rivet to be made by the machine without changing the heading tool or varying the stroke of the lever itself, in the manner substantially as described.

1,378.—Renssalear Reynolds, of Stockport, N. Y., for an Improvement in Let-off Motion for Looms:

I claim, first, The shaft, 1, with the friction roll, K, and endless screw, J, supported in a laterally oscillating stand, L, and applied, in combination with the yarn beam and with a constantly revolving disk, H, on the camshaft, G, or other suitably arranged shaft, and operating substantially as described.

Second, Combining the oscillating whip roll, E, with the oscillating stand, L, by means of a slotted arm, R, slotted lever, Q, and adjustable stud, f, substantially as and for the purpose specified.

Third, The arrangement of the spring, M, in combination with the laterally oscillating stand, L, lever, Q, rockshaft and arms, F R a a, and whip roll, E, for the purpose of counteracting the effect of tension of the yarn on the whip roll, substantially as described.

1,379.—J. S. Sammons, of New York City, for an Improved Mode of Roofing with Slate:

I claim the laying of the slate slabs, B, on the planks or boards, A, with strips, C, of india-rubber interposed between them and secured thereto by a solution of india-rubber, in connection with the cement, D, placed over the rubber strips, C, and completely filling the interstices between the slate slabs, while the latter are permanently secured in position by the screws, C, substantially as described.

1,380.—J. W. Smith, of Iowa Point, Kansas, for a Chair for Disseminating Medicated Vapors:

I claim the combination of flexible tubes and of a receptacle in which the air may be impregnated with vapor, as described, with a chain and bellows, for the purpose of producing medicated air or vapor.

1,381.—L. H. Smith, of Salem, N. J., for an Improvement in Sewing Machines:

I claim, first, A cloth holder mounted on wheels, running on the same rails as the sewing machine carriage and independent thereof, and provided with a suitable brake to secure it to the rail at any point.

Second, The combination of the friction clutch feed wheel, Q, or other suitable feed wheel, and traction wheels, L L, for imparting motion to a sewing machine carriage, as explained.

Third, The combination of the camshaft, Y y, rocker, b′, wheels, O O, hooked rod, U u, and spring, w, operating to throw the feed mechanism in and out of gear, as explained.

1,382.—Henry Steinway, Jr., of New York City, for an Improvement in Pianoforte Actions:

I claim the attachment of the repeating lever, C, to an arm, h, in front of the jack, the said lever and the jack passing the one through the other to bring the acting end of said lever in rear of the jack, substantially as described.

[This invention consists in a novel arrangement of a lever, in connection with the jack, for the purpose of effecting or assisting the return of the jack to its notch in the hammer but after the hammer has struck the string, and thereby providing a quick repetition of the blow.]

1,383.—Henry Steinway, Jr., of New York City, for an Improvement in Pianoforte Actions:

I claim, first, The arrangement of the repeating lever and the jack, in connection with a jack bottom, D, detached from the key, and in combination with the hammer but, whereby, as the jack is raised by the key in playing, the said lever is caused to gradually draw it toward the position for escape, substantially as specified.

Second, In combination with the repeating lever, arranged in connection with the jack and in combination with the hammer, as described, I claim the regulating screw, i, arranged in the hammer flanch, B, substantially as and for the purpose specified.

[This invention consists in a novel mode of applying the repeating lever in connection with the jack, and in combination with the hammer butt and key, whereby the escape of the jack is effected with an exceedingly small amount of friction, and facility is afforded for a very quick and very easy repetition of the blow of the hammer.]

1,384.—John Stillwell, of Griffin, Ga., for an Improved Churn:

I claim the combination of the brace bar, M, hinged arm, G, buttons, O O′, with a vertical barrel churn and rotary dashershaft, L, the whole being constructed and arranged in the manner and for the purposes set forth.

1,385.—J. L. Stuart, of New York City, for an Improvement in Vessel's Fire-extinguishing Apparatus:

I claim the combination of the rotary pump, H, slides, N N, tubular masts, R and R′, valves, X and X′, and pipes, T and T′, provided with hydrants, t, when combined and operated as shown and for the purpose set forth.

1,386.—Benjamin Upton, of Elyria, Ohio, for an Improvement in Upsetting Tire:

I claim the adjustable centerpin, b, passing through slots, l and o, said slots running the exact specific direction in combination with radial keys or wedges, i and i, constructed as described, for the purpose of centering the tire to be operated upon, and thereby prevent its being distorted or kinked, the whole being constructed in the manner and for the purpose substantially as specified.

1,387.—Joseph Vowles, of New Hudson, Mich., for an Improvement in Cultivators:

I claim the arrangement of the inclined braces, C C F F, standards, D D G G, handles, H H, and frame, A, as shown and described, whereby the several parts are made to brace and support each other, and a very firm and desirable implement obtained.

[This invention relates to an improvement on a cultivator and mowing machine, for which Letters Patent were granted to the inventor bearing date Feb. 14, 1860. The object of the invention is to simplify and perfect the patented machine aforesaid, and render the same capable of being adjusted for general work with greater facility than hitherto.]

1,388.—J. S. Whisler, of Albany, Ill., for an Improvement in Wagon Brakes:

I claim the combination of checkpiece, N, having a hook, k, with the rear part of the tongue and crankshaft, B, as and for the purposes set forth.

1,389.—H. G. Williams, of Warren, R. I., for an Improvement in Stop Motion for Drawing Frames:

I claim the combination of the separate trumpet carrier, B, and the tripping catch, F, and its spring, G, or their equivalents, with trumpet, A, and the catch lever, D, or their equivalents, the whole being arranged substantially in manner and to operate as and for the purpose described.

1,390.—W. C. Wyckoff, of Brooklyn, N. Y., for an Improved Cork Pull:

I claim the use or employment of a pointed rod, H I, in combination with the fork, F, operating automatically or operated by the spring, J, and folding handle, A B, when the same shall be arranged and operated in the manner described and for the purpose specified.

1,391.—C. A. Young, of Providence, R. I., for an Improved Machine for Making Upholstery Springs:

I claim, first, The said grooved rest, l, in combination with the coiling roll, R, when the said roll has a perpendicular movement close to, and passing the upper feeding roll, for supporting the inside and outside of the coil at the proper time, in the manner substantially as specified.

Second, I claim the guard, 3, formed and arranged in relative position with the feeding and coiling, as shown, in combination with the peculiar shear or cutting device, when the latter is operated by the face of the descending weight, T, substantially as and for the purpose specified.

1,392.—E. A. Burgess (assignor to Blake Brothers), of New Haven, Conn., for an Improved Cork Extractor:

I claim my improved cork extractor as constructed with its hanger or arm, D, its lower nut, E, its lifting and cork screws, C B, and nick stand, A, arranged and combined, or applied relatively to each other, substantially as and so as to operate as described.

1,393.—J. F. Drummond (assignor to Reynolds, Devoe and Pratt), of New York City, for an Improvement in Paint Cans:

I claim a paint can having one of the parts of its top sealed upon its inside to the rim of the pail by cement, e, and fastened to the pail by clasps, d d, formed as set forth, and the whole constructed otherwise as shown and described.

1,394.—J. A. Dyer (assignor to himself and H. C. Knowlton), of Newburgh, Ohio, for an Improvement in Machines for Cutting Chair Backs:

I claim the holder, L, the pieces, K K, and guides, N N′ N″, in combination with the revolving knifes, H, these several parts being constructed and operated substantially as and for the purpose set forth.

1,395.—E. F. Hurlbut (assignor to N. Bouton), of Chicago, Ill., for an Improvement in Patterns for Thimble Skeins:

I claim constructing the pattern of two parts, A B, substantially as shown, so that different butt parts, B, may be used with one and the same axle part, A, as and for the purpose set forth.

[The nature of this invention consists in the pattern used in making thimble skeins by which, while enabled to mold the same vertically, the cost of producing an increased or decreased shoulder to fit different sized wood axles is much cheapened, and the method of adjusting the green sand cores, so that they will be truly vertical, and thus produce a casting of even thickness.]

1,396.—Ira Jewell, of Wheaton, Ill., assignor to David M. Osborne, of Auburn, N. Y., for an Improvement in Harvesters:

I claim, in combination with the outside divider or grain end of a platform or grain table, a revolving wing board that is driven mechanically for the purpose of lifting up and carrying or throwing over the cut straw on to the platform, where it can be conveniently reached by an automatic or other rake, substantially as described.

1,397.—Strickland Kneass (assignor to S. J. Cresswell), of Philadelphia, Pa., for an Improvement in Sewer Inlets:

I claim, in combination with a sewer inlet, a ventilator that allows an escape of compressed air from the sewer, and admits of being converted into an inlet when the inlet proper is choked up, substantially as described.

1,398.—Walter Hunt, of New York City, assignor to J. W. and G. G. Martin, of Brooklyn, N. Y., for an Improvement in Lamps:

I claim the combination and arrangement of the filling tubes, C and F, valves, d and I, with the bent tubes, B and G, the same being constructed, arranged and operated substantially in the manner and for the purposes specified.

1,399.—S. J. Seely, of Brooklyn, N. Y., for an Improved Construction of Iron Vessels:

I claim the application of two or more series of iron plates to the construction of vessels, corrugated and arranged as described, for the purpose of imparting to the hull of the vessel the requisite degree of strength without the use of frames and braces, when the outer or planting series of such plates is applied with its corrugations running longitudinal with the hull, as set forth.

RE-ISSUES.

81.—Emerson Gaylord (assignee of L. M. Ferry), of Chicopee, Mass., for an Improvement in Hose Coupling. Patented Oct. 7, 1856:

I claim giving to one of the parts, B, a simultaneous, vertical and lateral movement, substantially in the manner and for the purpose shown and described.

I also claim the combination with each other and with the parts, A B, of the bevel lipped hood, a a, and bevel faced flanch, b b, in the manner shown and described.

I also claim constructing the hook, a a, and flanch, b b, respectively with hook and recess, h h′, as and for the purpose shown and described.

I further claim the combination with the parts, A B, of the inclined faced flanch, b′, staple, c, and wedge, d, in the manner and for the purpose shown and described.

[The object of this invention is to obtain a simple, economical and efficient hose coupling, one that may be very expeditiously connected and a perfect watertight joint formed.]

82.—H. G. Nelson, of Mexico, N. Y., for an Improvement in Water Wheels. Patented Aug. 28, 1860.

I claim, first, The combination of the polygonal flanged adjustable collars, F F′ c, with buckets, G, formed of simple plates of metal or other material forming connections between the said collar and secured to the flanches, c, by bolts, b′, all as shown and described and for the purposes explained.

Second, I also claim the arrangement of the gates, I I, shafts, H H, and sectors, J J, with the shaft, D, vent, C, and case, A, all as shown and described, for the purpose set forth.

[This invention consists in a novel and improved manner of constructing the wheel, whereby a very cheap, simple and durable wheel, with oblique or tangential buckets, is obtained. The invention also consists in an improved gate, arranged and applied to the scroll to regulate the discharge of the water therefrom and its consequent action on the wheel.]

83.—Charles Perly, of New York City, for an Improved Direct and Counter Motion Winch:

I claim the disk, d, provided with a handspike socket, and fitted upon the shaft carrying the winch head, and acting through the agency of pawls and ratchet teeth to rotate the winch in either direction, as set forth.

I also claim the pawl, 5, fitted to act on either side of its center, 6, that is, on the stanchion or timber, and take the teeth when moving in either direction, as specified.

84.—F. A. Redington and George McCluer, of Fredonia, N. Y., for an Improvement in the Manufacture of Cheese. Patented Feb. 8, 1859:

We claim, first, The described combination of the water box, A, milk vat, B, boiler, E, and reserve water box, G, with a six waycock, F, or substantially equivalent device, for forming a double communication between the boiler and either one of the water boxes exclusively, in the manner and for the purposes shown and explained.

Second, The arrangement in the described connection with the water box, A, milk vat, B, and boiler, E, of the discharging water pipe, g, extending from the top of the boiler into the box, A, and lengthwise beneath the bottom of the vat, B, to uniformly heat the contents thereof, in the manner and for the purpose shown and explained.

[This invention consists in the employment or use of a boiler applied to a milk vat, and used in connection with a hot water reserve box, whereby the temperature of the milk in the vat may be checked with the greatest facility without regulating or reducing the fire of the boiler, and without any unnecessary consumption of fuel. The invention also consists in the employment or use of a six waycock in connection with the milk vat hot water reserve box and water circulating pipes, for the purpose of regulating the flow of the water as occasion may require, for the proper heating of the milk.]

85.—H. D. Stover, of New York City, for an Improvement in Wood Planing Machines. Patented Dec. 18, 1860:

I claim the arrangement of the two screws, E, for elevating, lowering and retaining the planing cylinder, O, in position parallel with the face of the platen, substantially as described, when combined with the platen, B, operated movably to carry the lumber which is being dressed by the planing cutters, or stationary as a bed piece over and upon which the lumber is moved by feeding rollers to the cutting blades, in order that the entire cutting cylinder may be readily, easily and positively elevated or lowered and positioned as desired, and at all times fixed for use in such position parallel to the face of the platen ready for correctly dressing the surface of lumber at whatever elevation the planing cylinder may be placed.

I also claim encasing the raising and lowering screws, E, within the uprights, C, in which they operate, in order to effectually exclude dust, dirt and shavings.

I also claim providing the planing cylinder, O, with sectional cutting blades, P, each imparting or performing a shearing or drawing stroke or cut, essentially as described, to effect a nearly equal cut during the entire revolution of the planing cylinder, and so as to be easily removed, sharpened and reset for use.

I also claim forming that portion of the planing cylinder, O, which immediately back of the edges and in contact with the face surface of

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the cutting blades at an angle varying from 5° to 45° from the plane or face surface of the cutting blades, as the material being planed may require.

I also claim suspending the drive shaft, S2, in movable journal boxes, T, and so connecting them to the planing cylinder, O, by rods, U, or otherwise, that the axis of the drive shaft and the axis of the planing cylinder will always be equidistant from each other, to retain an equal uniform tension of the driving belts at whatever elevation the planing cylinder may be placed.

I also claim driving the platen, B, back and forth by means of the friction slide, A′, and friction wheel, D′, and the rack, B′, and pinion, C′, substantially as described.

I also claim starting, stopping and reversing the movement of the platen, B, by means of screw, M′, arranged substantially as described, for forcibly engaging the friction wheel, D′, with the friction slide, A′, which is attached to the platen or engaging or gearing the pinion, C′, with the rack, B′, which is also connected to the platen, in order to easily and gradually start the platen and a heavy piece into motion, and to quickly start the platen and a light piece into motion, as may be required.

I also claim the arrangement of the crosshead, M, which carries the planing cylinder, O, with the uprights, C, by adjustable gib slides, N, substantially as described, when combined with platen, B, which may be operated movably, or as a stationary bed for the lumber.

I also claim pivoting and giving a vertical adjustment by slot, C4, and pin, K′, or otherwise, to the journal box, H′, which carries the operating end of the friction drive roll shaft, so that it may freely swing and revolve when its friction drive roll is engaged or disengaged from its friction slide, A′, on the platen, and at the same time allow it vertically to adjust itself by means of the vertical movability of the journal box for causing the friction drive roll, D′, to correctly engage with its slide, A′, for the purpose set forth.

I also claim providing the platen, B, which is operated both movably and stationarily with several holding dogs, C′, operated independently of each other by cams, X′, or otherwise to hold several distinct and separate pieces while being dressed.

I also claim providing the feed roll frame with slides, so adjusted to the bed piece of the machine that the feed rolls may be readily slid or position therein for use and removed therefrom.

I also claim suspending, raising and lowering the crosshead which carries the planing cylinder by universal globular bearings, which are operated by and constitute the nuts for the screws, E, to allow a ready parallel or desired adjustment of the crosshead, in first constructing the machine, and also to admit a free, untrammelled and parallel movement to the planing cylinder, and at the same time retaining a firm working position at whatever elevation it may be placed.

I also claim a conductory, A4, made of any suitable material, open near the planing cylinder and at such other place as may be desired, when so combined with the planing cylinder that its velocity and the current of air thereby set in motion will remove the dust and shavings away from the machine through this conductory to such receptacle or place as may be desired.

I also claim the arrangement of the elastic surfaced pressure roll, C4, with the adjustable rigid pressure roll, D4, and adjustable scraper, F4, attached to and carried by the crosshead, M, by means of stands, B4, or otherwise, so that either the rigid roll or scraper can be used with the elastic roll, C4, at pleasure, or as may be required, essentially as described, when combined with the planing cylinder, for the purpose set forth.

I also claim so constructing the ways or slides of the bed piece, A, and of the platen, B, essentially as seen at A2 and A3, so that the platen may have a longer movement and not tip or become unsteady when more than half its weight projects over the end of the bed piece, thereby increasing the capacity of the machine so as to plane longer pieces than could be done by planing machines with the same length of bed and provided with the ways heretofore known.

I also claim the iron uprights, C, carrying the elevating screws, E, for raising, lowering and positioning the planing cylinder accurately with the top face of the platen, essentially as described, when combined with the bed piece which carries the platen for dressing the lumber, essentially as set forth.

86.—R. R. Taylor, of Reading, Pa., for an Improved Steam Hammer. Patented Jan. 1, 1861:

I claim, first, Combining the vibrating wooden helve, G, with the hammer block, moving in vertical guides, and with a double acting steam cylinder, when the latter is connected to the wooden helve at a point between the center of the helve's vibration and the hammer, as and for the purpose set forth.

Second, Operating both exhaust and steam valves by means of the projections, j, on the helve, and the slotted lever, h, with its adjustable set screws, k and k′, the whole being arranged and operating as set forth, for the purpose specified.

LIST OF CLAIMS FOR THE WEEK ENDING MAY 28, 1861.

1,400.—Henry T. Anthony and Frank Phoebus, of New York City, for an Improvement in Photographic Albums:

We claim forming the leaves for a photographic album by securing the flap, or split portion, at that edge which will be outermost when said leaves are bound, thus causing the free edges of the flap to be presented toward the back of the book, whereby those will be kept down upon the photograph without the need of paste or cement, as described.

1,401.—Julius de Bary, of Offenbach, Duchy of Hessens, Germany, for an Improvement in Cigar Machines. Patented in England November 1, 1859:

I claim, first, the conducting and compressing of the tobacco intended for the interiors or cores of the cigars by means of the bands, C and D, in combination with the metal square, Y, the whole being constructed and operated in the manner described.

Second, I claim the arrangement and construction of the jaw, E, on the end of the arm, a, and the manner of operating the same, for the purpose of receiving the portions of tobacco intended for a core of the cigar, which is cut off by the descent of the knife, G, and delivering the same in the rolling machine.

Third, I claim the use and arrangement of the roller, B, operating the endless band, X, in the manner and for the purpose substantially as described.

Fourth, I claim the employment of wrapping papers in the manufacture of the cores for cigars, in the manner and for the purpose described.

Fifth, I claim the described arrangement of the machinery for the manufacture of cigars, the whole being substantially constructed and operating in the manner described and specified.

1,402.—S. B. Black, of Harrisburgh, Pa., for an Improvement in Machines for Sowing Guano:

I claim the arrangement of the shaft, B, arms, a a, pins, d d, and the irregular bottom of the hopper, when the same are used and constructed as and for the purpose set forth.

1,403.—R. Brinkerhoff, of Mansfield, O., for an Improvement in Approach Opening Gates:

I claim the application of the toggle joint, a a a a, and the hinges, e e, as and for the purposes set forth.

1,404.—John Brooke, of U. S. Navy, for an Improved Detaching Hook for Nautical Use:

I claim the extension of the eye of the hook along the back of the hook through an arc of about 90 deg., the curve of the upper part of the eye being nearly concentric with the inner curve of the lower part or bend of the hook, also the guard, described and used therewith.

1,405.—J. B. Caldwell, of Chambersburgh, Pa., for an Improvement in Water Wheels:

I claim the particular arrangement shown and described of the two heads, c c′, with each other and with the buckets, e, box, D, and shaft, C, when the said heads and buckets are constructed in the peculiar form and united together in the peculiar manner set forth.

[This invention relates to an improvement in that class of water wheels in which power is obtained both by impact and reaction. The invention consists in a peculiar manner of constructing the wheel, whereby the same may be furnished at a reasonable cost, and very readily repaired when necessary, and the water also admitted to the wheel so that it acts upon the buckets in a very efficient manner, and without incurring any loss of power by being obstructed in its passage to the buckets.]

1,406.—J. H. Call, of Springfield, Mass., for Improvement in Callipers:

I claim the construction of inside callipers with a micrometer screw and spring, substantially in the manner as set forth.

1,407.—John D. Cochran, of Milford, N. H., for an Improved Washing Machine:

I claim the combination of the frame, C, with its elastic rolls, F F′, with stop, b, rod, a, and washing box, A, the parts being constructed and arranged to operate in relation to each other as and for the purposes set forth.

1,408.—Aaron Colton, of Attica, N. Y., for an Improvement in Corn Planters:

I claim the combination and arrangement of the frame, C D, carrying the seeding devices, with the axle of the truck, by means of the rock bar, h h, chains, g, and guides, H, substantially in the manner and for the purposes shown and described.

1,409.—T. S. Cone and H. S. Potter, of Oneida, Ill., for an Improvement in Cultivators:

We claim the pivoted frame, C C′, lever, D, pole, B′, beams, E E and F F, pivoted to rod a, as described, in combination with adjustable pivoted brackets, J J J, and pivoted shovel stocks, G G G′ G′, all arranged as shown and described.

1,410.—George Cook, of Bristoe Station, Ill., for an Improvement in Portable Capstans:

I claim, first, So arranging a swivel joint, R, in the otherwise rigid connection, q S T T, between the means, F G H I, for elevating the rear of the machine, and the means, M N O P, for elevating the front of the machine, that when the machine is fully elevated upon its wheel, the said joint, R, is over or in line with the king bolt, K, all substantially as and for the purpose set forth.

Second, the combination and arrangement of the eye, d, hook, j, and rope, J, or their equivalents, with the main spool or drum, B, and arm, B′, and with the small drum, D, and main lever, D′, so as to operate in the manner set forth.

1,411.—Lewis Cooper, of Philadelphia, Pa., for an Improvement in Sewing Machines:

I claim giving to the frame which carries the sewing mechanism a reciprocating movement in a direction at right angles to that of the feed motion at the time the pressure feet are lifted from the cloth by means of the pawl, d, ratchet, D, and cam, C′, substantially as and for the purpose specified.

1,412.—Frederick Decker, of Ostrander, O., for an Improvement in Clover Harvesters:

I claim the arrangement of the slotted adjustable plates, d d, with the cylinder, A, finger, c, separately adjustable plates, k k, and axles, m m, as and for the purposes shown and described.

1,413.—James and Asa H. Doty, of West Falls, N. Y., for an Improved Washing Machine:

I claim the rocking or flexible frame, in combination with the sectional convex corrugated rubbers, B B, and scolloped concave corrugated blocks, C C, when all shall be arranged substantially as and for the purpose specified.

1,414.—William M. Ferry, Jr., of Ferrysburg, Mich., for an Improvement in Saw Mills:

I claim, first, the slotted box, I, and roller, H, for the purpose of actuating the mechanism used in reversing the motion of saw mill carriages, substantially as set forth.

Second, the combination of the slotted box, I, and the roller, H, with the tripping devices, E L, stop spring, J, lever, e, rock shaft, d, and connecting rod, b, substantially in the manner and for the purpose described.

Third, the combination of the hand lever, O, rock shaft, M, jointed connecting rod, N, gage slide, g, and hinged adjustable oblique bar, f, substantially in the manner and for the purpose described.

Fourth, effecting a combination between the set rack bars, Q, and head block, and also the carriage, G, by means of the tenon, k, and flanged plates, l l, in the manner and for the purpose described.

1,415.—Jesse Gilman, of South Merrimack, N. H., for an Improved Feeding and Gigging-back Movement in Sawing Machines:

I claim the combination of the double peripheried pulley, C, and pulleys S T with each other and with the movable shafts, R R′, lever, N, cams, h h′, carriage, F, and rods, G H, all in the manner and for the purpose shown and described.

[This invention relates to an improvement in a machine for sawing laths, clapboards, &c., for which letters patent were formerly granted to this inventor, bearing date March 25th, 1856. The object of the above described invention is to simplify and perfect the feed and reverse movement of the bolt.]

1,416.—William H. Henderson, of Franklin, Ind., for an Improvement in Beading Rain Gutters:

I claim, first, reducing the rod on one side of the groove in it, for forming a round bead, as specified.

Second, the employment of the mortise, d, in the rod, as and for the purpose specified.

Third, the tapering form of the rod, whereby I am enabled to readily remove the bead, and whereby one end is formed to fit in the adjoining end of the next section of gutter, substantially as set forth.

Fourth, the tapering form of the bore to correspond with the rod, as and for the purpose specified.

1,417.—Albert V. Hill, of Carrollton, N. Y., for an Improvement in Fire-arms:

I claim the described notched key, with its lever, V, and eccentric disk, L, constructed as described, for the purpose of opening and securely closing the breech of a breech-loading fire-arm, in the manner set forth.

1,418.—J. J. Hirschbuhl, of Louisville, Ky., for an Improvement in the Vent-stoppers of Ordnance:

I claim the arrangement of the pivoted spring lever, c, and nose, D, with the hinged lever, B, and clamp, E, the whole constructed and operated in the manner and for the purposes shown and described.

1,419.—Sebre Howard, of Elyria, O., for an Improvement in Running Gear of Railroad Cars:

I claim giving a convex shape to the vertical sides of the journal boxes, C C, and a concave shape to the inner surfaces of the respective legs of the pedestals, B B, for the purpose of enabling the said journal boxes to be freely turned upon their vertical axes within the said retaining pedestals, in the manner and for the purpose set forth.

I also claim supporting the journal boxes that receive the inner ends of the divided axles between the curved open edges of the way plates, J R, that are bolted to the central beam, G, of the car frame; but this I only claim when the boxes, C C, which receive the outer ends of the said divided axles, are supported in such a manner that they are allowed to turn upon their vertical axes substantially in the manner set forth.

1,420.—Benjamin James, of Worcester, Mass., for an Improvement in Machines for Drying Wool, &c.:

I claim, first, the employment or use, for the purpose specified, of the two endless aprons, L M, arranged to work or move in contact substantially as shown, and used in connection with the endless feeding apron, B, fluted roller, D, concave, f, and picker, E, or an equivalent feeding device, to convey the stock between the aprons.

Second, the adjustable roller, u′, when used in connection with the stationary roller, t′, and endless aprons, L M, and placed in such relation with the drying chamber, H, to operate as and for the purpose set forth.

Third, the elastic pressure rollers, C C′, when used in connection with the feed apron, B, fluted roller, D, picker, E, and chute, G, for the purpose of properly presenting the stock to the endless aprons.

Fourth, the arrangement as described of the pulleys, j j′, with the belts, i o O, and the gearing, d e d′ e′, of the rollers, C C′ D, substantially as shown, to admit, when desired, of the stopping of the aprons, L M, and feeding mechanism, for the purpose specified.

[The object of this invention is to obtain a simple, compact and efficient machine for drying wool and other stock, preparatory to the manufacture of the same into textile and other or similar fabrics.]

1,421.—Richard F. Joynes, of Bristol, R. I., for Improved Steering Apparatus:

I claim the arrangement and combination of the mechanism for supporting, guiding and working the rudder, substantially as and for the purposes specified.

1,422.—Patrick Kerr, of New Bethlehem, Pa., for an Improvement in Furnaces for Smelting Iron Ore:

I claim the use of bosh and hearth, constructed as described and set forth, in which the width or proportion is reduced or enlarged as the quantity of bitumen in the coal employed as fuel is increased or diminished.

1,423.—Ambrose Kohler, of Boston, Mass., for Improved Heating Apparatus:

I claim, first, the combination of a series of truncated cones united at their larger and smaller bases alternately, as described, and surrounded by a series of similar cones of such diameter as to leave an annular zig-zag space between them, with inlet and outlet pipes, so arranged as to admit of cold air within the interior of the former series of cones by impinging and reverberating it against the highly heated surfaces thereof, and to discharge it when thus heated, substantially as described.

Second, In combination with the double series of cones and inlet and outlet pipes, arranged to operate as set forth, I claim the outer cylinder, provided with openings at their bottom for the admission of cold air, as specified.

1,424.—Jacob Maag, of Milwaukee, Wis., for an Improved Wind Wheel:

I claim, first, The excentric, o, in combination with the fan or storm board, m, and the toothed and beveled wheels, as set forth, for giving motion to the wings, as described.

Second, I claim the lever bar, g, as it is arranged in relation to the governor and to the means or parts operated by the storm board or fan and to the wings, as set forth.

1,425.—Charles B. Martin, of Fond du Lac, Wis., for an Improvement in Grain Separators:

I claim the combination with the shoe, C, of the rods, F a b c, slot, e, and rollers, D E E, the whole being constructed and arranged as shown and described, and operating in the manner and for the purposes explained.

[The object of this invention is to obtain, by a very simple means, a more thorough separation than heretofore of the grain from foreign substances, and to this end a series of screens are arranged in a novel way in the shoe and relatively with a rotary fan, whereby the best results are obtained from the screens and also from the fan. The shoe is also arranged in a novel way, so that it may adjust itself in a horizontal position if the separator be out of lever, or in an inclined position, in consequence of being placed on uneven ground.]

1,426.—Daniel Minthurn, of Beverly, Mass., for an Improvement in Valves:

I claim the valve constructed with two guides, b, and arranged at right angles to each other, and operating so as to ensure the accurate play and seating of the valve, as set forth.

1,427.—Josiah Mumford and J. W. Wilson, of Clarksburgh, O., for an Improvement in Cultivators:

I claim so hanging the pairs of plows that run on each side of the rows of plants to the frame and to each other as that they may have both a vertical and horizontal adjustment, as well as a rocking movement, on their shaft, H, but when so rocked, one plow of the pair shall not be thrown into or out of the ground more than its fellow, as described and represented.

1,428.—J. W. Ogle, of Concord, Ill., for an Improved Window Shade:

I claim the construction of a window curtain or shade attached to a frame divided into sections hinged together as described, for the purpose of regulating the admission of light and air.

1,429.—S. N. Park and J. A. Staats, of Somerville, N. J., for an Improvement in Machine for Cooling and Drying Flour:

We claim the use application of the tubular fans, a a, in combination with or attached to the runner of flouring mills, substantially as and for the purposes set forth.

1,430.—John Quigley, of Winona, Minn., for Improvement in Animal Traps:

I claim the arrangement of the platforms, B B′, axial pivot, J, common to both platforms, crank arm, D, trigger or retaining rod, E, stop latch, G, adjusting screw, K′, box 1, inclined bait supporting division board, C, and pit, 2, the whole being constructed and used together in the manner and for the purpose set forth.

1,431.—N. C. Sandford, of Meriden, Conn., for Improvement in Skates:

I claim the solid iron and wooden stock skate constructed and put together as herein described.

1,432.—O. B. Scofield, of East Stoughton, Mass., for Improvement in Adjustable Weather Strips:

I claim the combination and arrangement of the auxiliary bar, B, and its springs, C′ C, or their equivalents, with the flap, D, and the clamp bar, A, to be affixed to the door, and to operate therewith, substantially as specified.

1,433.—S. L. Shotwell and S. R. Hicks, of Ottawa, Ill., for Improvement in Steam Plows:

We claim, first, the arrangement of the additional steam cylinder and piston in connection with the propelling engineer engines and the oblique series of pulleys, h′, carrying independent or disconnected plows, when the whole is constructed and operated substantially in the manner and for the purposes set forth.

Second, the arrangement of the series of short links, t t, in combination with the series of independent plows or gangs, and the oblique bar, E″, mounted on wheels, F, for the purpose of giving the plows a free motion in passing obstacles and yet preventing said plows from falling sidewise, substantially as specified.

Third, We claim the above described peculiar arrangement of crank wheels, J J, loose pinions, L L, sliding clutches, M M, crank shaft, K, in combination with the driving wheels, D D, substantially as set forth.

Fourth, We claim the arrangement of the plow frames, o, and levers, g, applied to the beams, D′, to operate as and for the purposes set forth.

[The object of this invention is to obtain a steam plowing machine that will be simple in construction, efficient in its operation and under the complete control of the attendant, both as regards the management of the motive power—steam—and also as regards the plow attachment.]

1,434.—John Stephens and L. H. Buell, of New York City, for Improved Washing Machine:

We claim the employment of the stationary corrugated india rubber apron, H, stretched between end pieces, I I, when arranged for joint operation with a rubbing roller, F, the whole constructed as described for the purpose set forth.

[This invention relates to an improvement in that class of clothes washing machines in which a fluted roller is used in connection with an elastic or yielding bed,]

1,435.—Philip Teets, of New York City, for Improved Milk Can:

I claim as a new and improved article of manufacture the milk can herein described and represented.

[This invention relates to improvements in the manufacture of that class of tin milk cans which are used for transporting milk from place to place.]

1,436.—Joseph Tomilson, of Putnam, Iowa, for Improvement in Suspension Bridges:

I claim the within described method of constructing suspension bridges, the same consisting in combining rigid trusses having chords of material of different expansion and contraction under the same degree of temperature with the wire suspension cables, substantially as herein set forth.

1,437.—Otis Tufts, of Boston, Mass., for Improvement in Elevators:

I claim, first, constructing an elevator or hoisting apparatus, with a series of two or more hoisting ropes or chains, having independent attachments, and winding simultaneously upon the hoisting drum, for greater safety, substantially as described.

Second, Equalizing the strain upon the series of ropes or chains of my improved elevator or hoisting machine, by automatic adjustment, substantially as described.

Third, I claim, in combination with the hoisting apparatus, the spring balances for indicating the strain upon the ropes or chains employed, substantially as described.

1,438.—W. S. Weir, Jr., of Monmouth, Ill., for Improvement in Cultivators:

I claim, first, the combination of a spring catch, P, and catch plate, Q, with the plow frame, I, and seat frame, substantially as and for the purposes set forth,

Second, The combination with the seat frame and plow frame of catch plate, Q, spring catch, P, and adjusting blocks, d d, constructed

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and arranged to operate in relation to each other as and for the purposes set forth.

Third, I claim pivoting or hinging the plow frame, 1, to the front of the seat frame and in front of the seat frame and in front of the axle of the main supporting wheels in combination with providing said frame, I, with two sets of plows, J J, K K, arranged to operate in relation to each other as and for the purposes set forth.

1,439.—C. P. Wing, of Fayetteville, N.Y., for Improvement in Harvesters :

I claim constructing the reel with extension rods or beaters, U, and two separate shafts, R S, attached respectively to the main frame and platform to operate as and for the purpose set forth.

[The object of this invention is to prevent side-draught, also to facilitate the cutting operation and to so construct and arrange the reel as to allow the sickle and finger bar to rise and fall to conform to the inequalities of the surface of the ground without affecting in the least the perfect operation of the reel. The invention has further for its object the facilitating of the raking of the cut grain from the platform.]

1,440.—John M. de Bolle (assignor to himself, A. J. Husted and Edwin Hand), of Philadelphia, Pa., for an Improvement in Valves for Hose Pipes :

I claim the combination of the valve, C, handle, D, guard, F, lugs, g g, and spring, H, arranged and operating as and for the purpose set forth.

1,441.—J. A. Bradshaw, of Lowell, Mass., assignor to himself and Wm. H. Brown, Sen., of Pelham, N. H., for an Improvement in Machines for Winding Thread :

I claim, first, The combination of the two plate surface gears, I J, with the pinion, K, hung and adjusted as described, for the purpose and substantially as set forth.

Second, I claim the combination of the friction gear, d, clamp, c, set screw, f, with the wormshaft, H, for the purpose and substantially as described.

1,442.—Frederick Landon (assignor to B. E. Huntley, J. M. Bowman and Charles and Lafayette Silliman), of Brockport, N. Y., for an Improvement in Harvesters :

I claim, first, The combination of a hand lever with the traction lever, D, for the purpose set forth and substantially as described.

Second, The combination of a seat frame with the traction lever, D, of a harvesting machine, for the purposes set forth and substantially as described.

Third, The combination of the hand lever, C', with the traction lever, D, and the seat frame, b b b, for the purposes set forth and substantially as described.

1,443.—Elisha Matteson, of Brooklyn, N. Y., assignor to D. Towsley, of New York City, for an Apparatus for Locomotion :

I claim, first, The use or employment of the platform, D, in combination with the driving wheels, L L, the brakes, M M, and the levers, Q Q, arranged and operating in the manner and for the purpose or purposes set forth and specified.

Second, I also claim the brakes, M M, and levers, Q Q, suspended and connected by their crossbars in the manner set forth and for the purpose or purposes specified.

1,444.—S. P. McCroskey, of Monroe, Iowa, assignor to himself and Wm. D. Nichols, of Davenport, Iowa, for a Preparation to Render Maize Suitable for Grinding :

I claim the process of treating Indian corn, preparatory to grinding with the compound, substantially as described, without limiting myself to the exact proportion of elements specified.

1,445.—N. R. Merchant (assignor to himself and A. P. Merchant), of Gifford, N. Y., for an Improved Boring Machine :

I claim the combination of the adjustable spur wheel, D, and adjustable stands, C C, with augur bearings, f f, attached, said parts being arranged or applied to a slotted frame, B, to operate as and for the purpose set forth.

1,446.—J. H. Merrill (assignor to the Merrill Patent Firearms Manufacturing Company), of Baltimore, Md., for an Improvement in Firearms :

I claim combining with the piston of a breech-loading gun, a copper plug and split rim, for the purpose of causing the discharge through the more ready expansion of the copper to pack the joint between the piston and the bore of the gun, substantially as described.

1,447.—J. H. Merrill (assignor to the Merrill Patent Firearms Manufacturing Company), of Baltimore, Md., for an Improvement in Firearms :

I claim, in combination with a piston having a copper plug in it and a split rim, the making a groove in the plug or plunger, for the purpose and in the manner substantially as described.

1,448.—G. M. Phelps, of Williamsburg, N. Y., assignor to the American Telegraph Company, for an Improvement in Telegraphic Apparatus :

I claim governing the angular position of a type wheel and controlling the motions of a platen by force derived from compressed air, or other fluid, by means of the combination of a valve actuated by an electro-magnet with a piston, a platen and a corrector, combined with each other, and operating in combination substantially in the manner specified.

1,449.—G. B. Phillips (assignor to J. S. Little), of Newark, N. J., for an Improvement in Wrenches :

I claim, as a new article of manufacture, the pipe wrench described in the specification.

1,450.—J. A. Scott (assignor to himself and P. Robins), of Rochester, N. Y., for an Improvement in Grain Separators :

I claim the arrangement of the flues, A and B, the two sets of screens, C and D, the one above the other, the shoot board, E', cockle screen, C', shoot board, E, hopper, H, and fan, F, when constructed and operating as and for the purpose shown and described.

1,451.—Philander Shaw (assignor to himself and E. Townsend), of Boston, Mass., for an Improvement in Hot Air Engines :

I claim, first, A hot air engine in which the cylinder is placed directly over the firebox and forms a continuation of the same, separating the cylinder from the firebox by a partition or head, and admitting the air to the cylinder through a valve in it operated by the engine, for the purpose specified.

Second, I claim the chamber, O, surrounding the furnace and more or less of the cylinder, and placed between the furnace and the air pump, and communicating with the two in combination with the partition, P, arranged and operating in the manner substantially as set forth.

1,452.—J. W. Stoakes (assignor to himself and J. N. Boyland), of Milan, Ohio, for an Improvement in Sewing Machines :

I claim the slot, V, of the looper, the slot, S, of the cam, and the stationary arm, R, when arranged and operating conjointly in the manner and for the purpose set forth.

RE-ISSUE.

87.—Edward Maynard, of Washington, D. C., for an Improvement in Metallic Cartridge Cases. Patented Jan. 11, 1859 :

I claim a double-bottomed cartridge composed of an elastic metal cup and an exterior metallic disk, the said cup and disk being permanently united with each other by soldering, or some other similar process, substantially in the manner set forth.

DESIGNS.

56.—S. R. Hawley, of New York City, for a Design for Hats.

57.—I. D. Brewer, of Cambridge, Mass., for a Design for a Label or Trade Mark.

58.—M. C. Burleigh, of Somersworth, N. H., for a Design for Stoves.

59.—C. M. Cooke, of Waterloo, N. Y, for a Design for a Balmoral Skirt.

60.—Miles Greenwood, of Cincinnati, Ohio, for a Design for Pumps.

61.—A. F. Johnson, of Boston, Mass., for a Design for a Trade Mark.

62.—S. W. Gibbs (assignor to J. F. Rathbone), of Albany, N. Y., for a Design for a Parlor Stove.

63.—Edward Maynard, of Brooklyn, N. Y., assignor to G. L. Kelty, of New York City, for a Design for Curtain Loops.

64.—J. J. Morrisett (assignor to J. L. Dodge), of New York City, for a Design for Hats.

65.—Garrettson Smith and Henry Brown (assignor to Cox, Whitman & Co.,) for a Design for Stoves.

66.—N. S. Vedder, of Troy, N. Y., assignor to Vincent Tibbals, Shirk & Co., of Erie, Pa., for a Design for a Cook Stove.

NOTE.—The very next mail after our "forms" were closed and sent to press, we were in receipt of the above two lists of patents, both reaching our office at the same time. The patents bearing date the 21st of May must certainly have been issued from the Patent Office one week preceding those of the 28th, and still the claims for both weeks came together, showing great want of system in the mailing department of the Patent Office, which we trust the Commissioner will see corrected. In the above lists of patents we recognize THIRTY-SEVEN of this number which were solicited through this office.

New Books and Periodicals Received.

THE WESTMINSTER REVIEW. Published by Leonard Scott & Co., Gold-street, this city.

The present number of this able Quarterly contains nine original essays, one of which, on "The Cotton Manufacture," exhibits great ability and research. We shall endeavor to transfer the substance of this article to our columns at some future time.

NORTH BRITISH REVIEW.—Published by Leonard Scott & Co., New York.

This celebrated quarterly—the organ of the Free Presbyterian Church of Scotland—contains eleven essays in its last issue, all marked by profound thought. The moral tone of the North British is high.

SECOND STANDARD PHONOGRAPHIC READER.—Andrew J. Graham, author and publisher, Phonetic Depot, New York.

This is said, by disinterested parties, to be the shortest of all systems of shorthand

THE SOLDIER'S POCKET HEALTH COMPANION—By Dr. J. Walter Scott. Published by Robert M. DeWitt, 13 Frankfort st., New York.

This is a little pamphlet of pocket size, containing directions for the preservation of soldiers' health and Soyers' admirable receipts for army cooking, which will be found valuable.

Home Queries

S. F., of Pa.—There is nothing new in your plan of exploding round shells, by means of chlorate of potash and sulphuric acid.

G. & C. B., of Ohio.—We cannot give you a recipe for a waterproof stiffening mixed with gum in a watery solution. The only waterproof varnishes known to us are made from oil and india-rubber mixtures. Boil a small quantity of bleached linseed oil with some of your stiffening, and try what effect it will have.

G. C., of Ill.—Address Hon. Amos Kendall, at Washington, or Professor Morse, at Poughkeepsie, N. Y., about the use of the Morse patent for the States and Territories of the West. Neither the House nor Bain telegraphs are infringements of the Morse patent. Wheatstone and Steinheil have no American patents for their telegraphs.

S. P. N., of N. J.—Articles coated with mastic or gum sandarach varnish should be dried in a warm place, or they will have no lustre.

J. L., of Grass Lake.—If you will furnish us with your post office address, we will send you one of our pamphlets of advice how to obtain a patent. The patent fee is now $15, in advance; and when the Letters Patent are issued, $20 additional must be paid.

O. H. P. P., of Pa.—We are not yet ready to publish your MSS. on water wheels, owing to the great pressure upon our columns of other matter, just now of absorbing interest. We hope before long to devote space to that subject.

R. W., of Maine.—D. Fish, of this city, and Morgan James, of Utica, N. Y., are distinguished rifle makers. Locomotives are made at the Lowell Machine Shop; also, at Taunton, Mass., by Mr. Mason. The Maynard breech-loading rifle is manufactured at Chicopee, Mass. Address Mr. J. McFarland, at Chicopee, for further information.

T. H. McC., of Pa.—There is not a gun-cotton engine now in existence, so far as we know.

W. W. S., of Mass.—The bichromate of potash is not employed to color silk and wool yellow, but it is so used for cotton. The mordant used is acetate of lead—three ounces to every ounce of the bichromate. This quantity will make a straw color on five pounds of cotton.

C. C., of Ohio.—It is now too late to remedy the worm nuisance on shade trees, but we have seen it stated that by washing the trunks of the trees in the month of March with soap and water, this annoyance would be effectually avoided.

R. P., of Mass.—The Dahlgren gun is an ordinary cannon, except that it is made very thick at the breech for some three or four feet, when it tapers down sharply to less than the usual size. It makes a strong gun. Some of our war vessels are armed with these guns, some of which are capable of carrying a 9-inch shell three miles.

S. H. C., of Ohio.—The "Articles of War" are the laws passed by Congress, and approved April 10, 1806, which regulate the government of the armies of the United States. The discipline is quite rigid, as it should be, in order to secure perfect subordination. You will find them published in the United States Infantry Tactics, recently issued by J. B. Lippincott & Co., Philadelphia.

H. C., of Pa.—We are not aware that steel cannon are made in this country. The government has paid no attention to this subject, though frequently urged to do so. Just at this time it is too deeply involved in warlike movements to conduct careful experiments. We hope this matter will receive your careful attention and experiment.

Money Received

At the Scientific American Office on account of Patent Office business, during one week preceding Wednesday, June 12, 1861 :—

L. B., of Mich., $15; K. H. P., of N. Y., $25; A. B., of C. W., $44; F. & W., of N. Y., $25; J. B. J., of Min., $25; N. L. M., of Mo., $15; M. & O., of Ill., $15; J. F. W., of N. Y., $15; A. B., of N. Y., $25; W. E. F., of Mass., $15; G. R., of Ind., $15; E. B., of N. Y., $12; S. J. P., of Conn., $10; E. A. K., of Conn., $25; W. H. & Bro., of N. Y., $115; A. A. L., of Iowa, $15; A. K., of N. Y., $15; C. M. P., Jr., of N. Y., $15; J. A. A., of Conn., $15; H. F., of Ohio, $15; R. B., of Iowa, $40; A. L. W., of Mass., $15; E. S. N., of Ill., $20; W. P., of N. Y., $15; S. & A., of Md., $10; L. A. B., of N. Y., $15; G. L. K., of Pa., $25; L. S., of N. Y., $25; H. & P., of N. Y., $45; W. M. M., of Ill., $40; B. T. S., of Ill; $15; J. F. & W. L. B., of Ill., $25; J. A., of Conn., $20; W. F. J., of N. Y., $20; S. W., of Mass., $20; J. G., of Mass., $45; M. S. P., of Me., $20; G. R., of N. Y., $20; N. B., of N. Y., $20; M. D. W., of Ind., $20; J. A. W., of N. Y., $20; R. H., of N. Y., $20; A. R., of N. J., $15; W. E. W., of Cal., $35; J. & M., of N. Y., $15; J. B. W., of Pa., $15; M. W. M., of N. Y., $25; P. R. C., of N. Y., $32; G. S., of N. Y., $15.

Specifications and drawings and models belonging to parties with the following initials have been forwarded to the Patent Office from June 5 to Wednesday, June 12, 1861 :—

L. C., of N. Y.; E. T. B., of N. Y.; E. A. K., of Conn.; W. & M., of N. H.; M. W. M., of N. Y.; J. F. & W. L. B., of Ill.; J. C., of L. I.; J. P. J., of Minn.; G. R., Jr., of Ind.; F. & W., of N. Y.; L. S., of N. Y.; A. B., of C. W.; W. P., of N. Y.; A. B., of N. Y.; T. H. K., of N. Y.; K. P. K., of Vt.; P. R. C., of N. Y.; W. E. W., of Cal.; G. L. K., of Pa.

TO OUR READERS.

Models are required to accompany applications for Patents under the new law, the same as formerly, except on Design Patents, when two good drawings are all that is required to accompany the petition, specification and oath, except the government fee.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and inclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

BINDING.—We are prepared to bind volumes, in handsome covers, with illuminated sides, and to furnish covers for other binders. Price for binding, 50 cents. Price for covers, by mail, 50 cents; by express or delivered at the office, 40 cents.

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NEW PAMPHLETS IN GERMAN.—We have just issued a revised edition of our pamphlet of *Instructions to Inventors*, containing a digest of the fees required under the new Patent Law, &c., printed in the German language, which persons can have gratis upon application to this office. Address MUNN & CO.,
No. 37 Park-row, New York.

CHANGE IN THE PATENT LAWS.

NEW ARRANGEMENTS—PATENTS GRANTED FOR SEVENTEEN YEARS.

The new Patent Laws, recently enacted by Congress, are now in full force, and promise to be of great benefit to all parties who are concerned in new inventions.

The duration of patents granted under the new act is prolonged to SEVENTEEN years, and the government fee required on filing an application for a patent is reduced from **$30** down to **$15**. Other changes the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing Disclaimer	$10
On filing application for Design, three and a half years	$10
On filing application for Design, seven years	$15
On filing application for Design, fourteen years	$30

The law abolishes discrimination in fees required of foreigners, except in reference to such countries as discriminate against citizens of the United States—thus allowing English, French, Belgian, Austrian, Russian, Spanish, and all other foreigners except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms.

During the last sixteen years, the business of procuring Patents for new inventions in the United States and all foreign countries has been conducted by Messrs. MUNN & CO., in connection with the publication of the SCIENTIFIC AMERICAN; and as an evidence of the confidence reposed in our Agency by the Inventors throughout the country, we would state that we have acted as agents for more than FIFTEEN THOUSAND Inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of Inventors and Patentees, at home and abroad. Thousands of Inventors for whom we have taken out Patents have addressed to us most flattering testimonials for the services we have rendered them, and the wealth which has inured to the Inventors whose Patents were secured through this Office, and afterward illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! We would state that we never had a more efficient corps of Draughtsmen and Specification Writers than are employed at present in our extensive Offices, and we are prepared to attend to Patent business of all kinds in the quickest time, and on the most liberal terms.

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Testimonials.

The annexed letters, from the last three Commissioner of Patents, we commend to the perusal of all persons interested in obtaining Patents:—

Messrs. MUNN & Co.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the Office, a marked degree of promptness, skill and fidelity to the interests of your employers. Yours, very truly,

CHAS. MASON.

Immediately after the appointment of Mr. Holt to the office of Postmaster-General of the United States, he addressed to us the subjoined very gratifying testimonial:—

Messrs. MUNN & Co.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you have discharged your duties of Solicitors of Patents while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and, I doubt not, justly deserved) the reputation of energy, marked ability and uncompromising fidelity in performing your professional engagements. Very respectfully,

Your obedient servant, J. HOLT.

MESSRS. MUNN & Co.:—Gentleman: It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency, and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully,

Your obedient servant, WM. D. BISHOP.

The Examination of Inventions.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a fulldescription, for advice. The points of novelty are carefully examined, and a reply written corresponding with the facts, free of charge. Address MUNN & CO., No. 37 Park-row, New York.

Preliminary Examinations at the Patent Office.

The advice we render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there, but is an opinion based upon what knowledge we may acquire of a similar invention from the records in our Home Office. But for a fee of $5, accompanied with a model or drawing and description, we have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a Patent, &c., made up and mailed to the Inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through our Branch Office, corner of F and Seventh-streets, Washington, by experienced and competent persons. Over 1,500 of these examinations were made last year through this Office, and as a measure of prudence and economy, we usually advise Inventors to have a preliminary examination made. Address MUNN & CO., No. 37 Park-row, New York.

Caveats.

Persons desiring to file a Caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The government fee for a Caveat, under the new law, is $10. A pamphlet of advice regarding applications for Patents and Caveats furnished gratis on application by mail. Address MUNN & CO., No. 37 Park-row New York.

How to Make an Application for a Patent.

Every applicant for a Patent must furnish a model of his invention, if susceptible of one; or if the invention is a chemical production, he must furnish samples of the ingredients of which his composition is composed, for the Patent Office. These should be securely packed, the Inventor's name marked on them, and sent, with the government fee, by express. The express charge should be prepaid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by draft on New York, payable to the order of Munn & Co. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO No 37 Park-row New York.

Rejected Applications.

We are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of our Washington Agency to the Patent Office affords us rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Our success in the prosecution of rejected cases has been very great. The principal portion of our charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted are invited to correspond with us on the subject, giving a brief history of their case, inclosing the official letters, &c.

Foreign Patents.

We are very extensively engaged in the preparation and securing of Patents in the various European countries. For the transaction of this business, we have offices at Nos. 66 Chancery-lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. We think we can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through our Agency.

Inventors will do well to bear in mind that the English law does not limit the issue of Patents to Inventors. Any one can take out a Patent there.

Circulars of information concerning the proper course to be pursued in obtaining Patents in foreign countries through our Agency, the requirements of different Patent Offices, &c., may be had gratis upon application at our principal office, No. 37 Park-row, New York, or either of our Branch Offices.

Interferences.

We offer our services to examine witnesses in cases of interference, o prepare arguments, and appear before the Commissioner of Patents or in the United States Court, as counsel in conducting interferences or appeals.

For further information, send for a copy of "*Hints to Inventors.*" Furnished free. Address MUNN & CO., No. 37 Park-row, New York.

The Validity of Patents.

Persons who are about purchasing Patent property, or Patentees who are about erecting extensive works for manufacturing under their Patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing Patent, before making large investments. Written opinions on the validity of Patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited For further particulars, address MUNN & CO., No. 37 Park-row, New York.

Extension of Patents.

Valuable Patents are annually expiring which might be extended and bring fortunes to the households of many a poor Inventor or his family. We have had much experience in procuring the extension of Patents; and, as an evidence of our success in this department, we would state that, in all our immense practice, we have lost but *two* cases, and these were unsuccessful from causes entirely beyond our control.

It is important that extension cases should be managed by attorneys of the utmost skill to insure success. All documents connected with extensions require to be carefully drawn up, as any discrepancy or untruth exhibited in the papers is very liable to defeat the application.

Of all business connected with Patents, it is most important that extensions should be intrusted only to those who have had long experience, and understand the kind of evidence to be furnished the Patent Office, and the manner of presenting it. The heirs of a deceased Patentee may apply for an extension. Parties should arrange for an application for an extension at least six months before the expiration of the Patent.

For further information as to terms and mode of procedure in obtaining an extension, address MUNN & CO., No. 37 Park-row, New York.

Assignments of Patents.

The assignment of Patents, and agreements between Patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park-row, New York.

It would require many columns to detail all the ways in which the nventor or Patentee may be served at our offices. We cordially invite all who have anything to do with Patent property or inventions to call at our extensive offices, No. 37 Park-row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

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1,000 tuns No. 1; 1,000 tuns No. 2. This iron has been used by the Federal government since its organization, and is now called for to complete the specifications just issued for the marine engines to be built for government service. For sale in lots to suit purchasers by the manufacturers only.
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COMBINATION CAMP BLANKET.
This is a knapsack and can be used as a cloak and always as a blanket. With three other blankets it can be made into a tent. It is fitted with straps, and when folded makes the knapsack. Besides being a waterproof blanket, it is lighter than the ordinary knapsack and blanket. When known, they will be universally adopted.

OPINIONS OF ARMY OFFICERS, &c., &c.
NEW YORK, May 29, 1861.

TO THE RUBBER CLOTHING COMPANY—
Gentlemen: The combination knapsacks with which you furnished the Ellsworth Zouaves have proved themselves invaluable to us in our campaign in Washington and Alexandria. I hardly know what the men would have done without them, as they have answered to keep them dry in sleeping on the wet ground at night.
As a waterproof garment when on guard, or as a tent, they stand the heat perfectly; the sun, although hot, has no effect upon them. In short, I can confidently recommend them as the best and most serviceable I have seen.
(Signed) Lieut. S. W. STRYKER, Co. B, 1st N. Y. Zouaves.

FIRST REGIMENT U. S. NATIONAL GUARD, FIREMEN ZOUAVES,
Alexandria, June 4, 1861.

TO THE RUBBER CLOTHING COMPANY—
Gentlemen: We have tried your blanket knapsacks and find them a great improvement on the ordinary knapsack. They are good for a tent when joined together, and excellent to sleep on, as no dampness from the ground affects the men. All regiments should have them.
Yours, truly,
NOAH L. FARNHAM, Colonel.
(Signed) JOHN A. CREGEER, Major.
JOHN COYLE, Captain Co. A.
ED. BYRNE, " " B.
M. C. MURPHY, " " C.
JOHN DOWNEY, " " D.
JNO. B. LEVERICH, " " E.
M. LAGEN, " " G.
WM. HACKETT, " " H.
C. WESLEY, " " I.
JOHN WILDEY, " " I.
ANDREW D. PURTELL, " " K.
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ARMY KNAPSACKS.
Made from our beautiful enameled rubber, with leather straps; also a cheap knapsack, enameled cloth.

WATERPROOF KNAPSACKS.
Universally approved and adopted by all the New England regiments. Also, Haversacks, not waterproof, made from plain white duck, painted oil cloth, or of painted enamel cloth.

CANTEENS.
The only article for carrying water. Portable and convenient. Made with rubber inside, and with white or blue cotton drill (or cloth same as uniform) on the outside, or with rubber outside. None but Britannia metal mouthpieces are used. Highly recommended by ex-Mayor Dr. J. V. C. Smith, of Boston, after extensive travels in Asia and Africa, as an important means of preserving water fresh and palatable under a burning sun.

OFFICERS' COATS AND CLOAKS.
Made of any desired shape or pattern; also light capes, or double capes in the French style. The most serviceable is a long, loose coat with sleeves, made either on cotton or woolen as desired. These coats can also be used as blankets.

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Made on drilling of any size, with gummet holes for lacing. Essential for covers to wagons or goods exposed to the weather. For army transportation wagons they are invaluable for the protection of food or other articles from damp or wet weather.

CAMP BLANKETS.
Made on cotton drilling, cotton flannel, or woolen flannel—white, blue or scarlet—coated with white, black, black enamel or gloss rubber. Light, durable and waterproof, and indispensable for our soldiers' health. The woolen flannel, with the black gloss rubber, is the best. A cheaper blanket is made on cotton, weighing 1½ pounds. These blankets, when ordered, are made with eyelet holes, so that they can be used as a tent or an awning.
All goods from this establishment are made of the Enameled Gloss Rubber, and warranted to stand any climate.
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RARE CHANCE.—C. T. AMSLER, OPTICIAN, NO. 635 Chestnut-street, Philadelphia, is offering from the 1st of June his large stock of Mathematical, Optical and Philosophical Instruments at 20 per cent below the regular retail prices; Swiss instruments and magic lanterns, photograph of war scenes, &c., are sold at the same rate. 25 4*

ELECTRIC WEATHER INDICATOR.—THIS NEAT and curious instrument foretells the weather from 12 to 24 hours in advance. Sent free by mail for 50 cents, by addressing the manufacturers, LEE & CO., Newark, New Jersey. Liberal discount to agents.

WANTED TO PURCHASE—MACHINES FOR making Bolts and Nuts; new or secondhand. Address, giving particulars, W. J. SIWEL, No. 51 Congress-street, Pittsburgh, Pa. 24 2*

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BAR IRON AND STEEL OF ALL KINDS, SIZES AND shapes, for sale in any quantity for cash or on time. N. B.—Ulster bar iron of all sizes for machinery, &c. EGLESTON, BATTELL & CO., No. 166 South-street, New York. 14 8*eow

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A MESSIEURS LES INVENTEURS—AVIS IMPORTANT. Les Inventeurs non familiers avec la langue Anglaise et qui préféreraient nous communiquer leurs inventions en Français, peuvent nous adresser dans leur langue natale. Envoyez nous un dessin et ure description concise pour notre examen. Toutes communications seront reçues en confidence.
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GUILD & GARRISON'S STEAM PUMPS FOR ALL kinds of independent Steam Pumping, for sale at Nos. 55 and 57 First-street, Williamsburgh, L. I., and No. 74 Beekman-street, New York. 1 26 GUILD, GARRISON & CO.

SOLID EMERY VULCANITE.—WE ARE NOW MANUfacturing wheels of this remarkable substance for cutting, grinding and polishing metals, that will outwear hundreds of the kind commonly used, and will do a much greater amount of work in the same time, and more efficiently. All interested can see them in operation at at our warehouse, or circulars describing them will be furnished by mail.
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PECK'S PATENT DROP PRESS.—THE MOST PERfect machine in use for the manufacture of silver, copper or tinware, spoons, jewelry, forging, &c. Manufactured by the patentee.
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C. L. GODDARD, AGENT, NO. 3 BOWLING GREEN, New York. Only manufacturer of the Steel Ring and Solid Packing Burring Machines and Feed Rolls for Wool Cards, &c. 25 26*

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6000 AGENTS WANTED—TO SELL SIX NEW inventions—two very recent, and of great value to families; all pay great profits to agents. Send four stamps and get 80 pages particulars. EPHRAIM BROWN, Lowell, Mass. 16 13*

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N. E. HALE, MANUFACTURER OF PATENT BELT Hook Pilers and Belt Punch, Nashua, N. H. 15 11*

Zur Beachtung für deutsche Erfinder.

Die Unterzeichneten haben eine Anleitung, die Erfindern das Verhalten angibt, um sich ihre Patente zu sichern, h ausgegeben, und verabfolgen solche gratis an dieselben.
Erfinder, welche nicht mit der englischen Sprache bekann sind, können ihre Mittheilungen in der deutschen Sprache machen. Skizzen von Erfindungen mit kurzen, deutlich ge sehr ebenen Beschreibungen beliebe man zu addressiren an
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Preis 20 Cts., per Post 25 Cts.

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Experiments with Iron and Steel.

In the London *Chemical News* of the 25th of May, there is an article by M. E. Frémy, on the composition of cast iron and steel, which is very satisfactory in the proof adduced that nitrogen is the great agent in converting iron into steel.

He states that he placed wrought iron in a tube and submitted it at a red heat to the action of dry illuminating gas for two hours, and obtained a very regular carburation, when the metal was converted into gray cast iron of a very superior quality. He then passed a mixture of ammonia and coal gas on red hot iron, and obtained steel.

He also states that, for the first time, he has produced steel by means of the successive actions of two gases—ammonical and common coal gas, composed of hydrogen and carbon. He thinks that gas will yet be employed in the convertation of iron to obtain a superior quality. He says :—

It remained now for me to show whether nitrogen, which is evidently a converting agent, remains in the steel, or whether it is only an agent to present carbon to the iron in a state favorable to the chemical combination of the two.

To resolve this question, he submitted the steel which he made with ammonia and illuminating gas to the influence of a test agent to prove the presence of the nitrogen being a component part of the steel. This was dry hydrogen gas. He therefore heated some of his steel prepared with nitrogen in a tube containing dry hydrogen and ammonia passed off. It was formed by the combination of the hydrogen with the nitrogen gas in the steel.

Breech-Loading Cannon.

The New York *Tribune* publishes a letter from Mr. Stillman, now in Paris, in which he pronounces, on the authority of artillery officers in the French service, and especially of Colonel Eyma, head of the Bureau of National Foundries, all breech-loading cannon, of whatever name, are altogether useless arms as field guns. He says :—

They are frequently more dangerous to those who fire them than to the enemy. Of the Whitworth gun, the only quality in which it surpasses any other is in its range, which is owing to the great length and weight of the shot as compared with its section of resistance to the atmosphere, and not in the least to any quality in the gun itself. The shot is in effect of the shape of one of the pins used in our bowling alleys, a short iron bolt. The defects of the gun are several ; the two most serious being the liability of the shot to wander, owing to the absolute impossibilty of getting a mechanical fit of an iron shot in a steel barrel, without speedily destroying the bore of the gun, and the ricochet of the shot occurring rarely, and when occurring, being most uncertain.

In addition to these objections, it takes twice the time to load this gun than it does the ordinary Napoleon gun, and it costs more than five times as much. Both these last objections apply also to the Armstrong gun, though the first-named do not. The French government have determined, after carefully experimenting with the breech-loading cannon, and from the experience of the expddition to China, to adopt none of them, finding it impossible to make the breech secure. Colonel Eyma declared that the Armstrong guns used in the expedition to China required a brigade of mechanics to follow the artillery to keep the guns in order.

There are many who are of the opinion that the simple, muzzle-loading rifled bronzed cannon, of the pattern of the improved Napoleon, is the best. The shot is conical, with plugs of lead to fill the grooves, arranged in two circles, so as to give two points of bearing. They can be fired at the rate of once in 16 seconds.

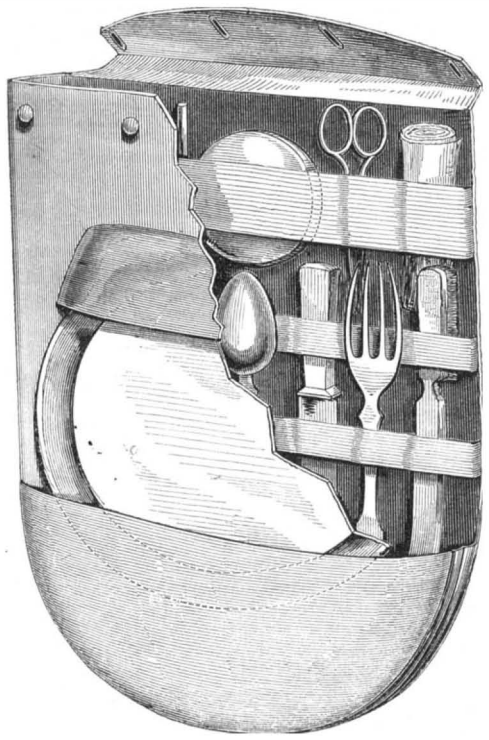
We have published a great deal of information, both for and against the breech-loader, and have been assured by the highest authority that they were not equal to the muzzle-loader. If this is really so, the conduct of the British government in continuing to manufacture them for its service is most unaccountable.

Light for Animals.

One more important item of advice, and that is, locate your pen where your hogs can have the benefit of light. I don't mean merely *daylight*, but the full bright light of the sun ; it will add to their cheerful contentment, as it does to the human species, and physiologists declare that, other things being equal, families who occupy apartments in the sunny side of dwellings are the most healthy and happy. Although the comparison may, to sensitive nerves, appear odious, still it is beyond our power or province to change the established laws of nature. I never knew of a hog, or any other animal, kept under the north side of a barn or other building, where the dampness and darkness are never penetrated by the sun's rays, and where the animal was employed as the scavenger for other animals, to be sleek-looking, fat, clean or quiet. I have seen many a pen where the mud and offal were two or three feet deep, and no place of retreat left for the poor occupants upon a higher spot, excepting the bed floor, and that unfurnished by straw.—*Homestead.*

A Kit for Soldiers.

Experience in campaigning always teaches a soldier the importance of having his knapsack packed so that all of the articles can be readily found, even in the dark. The accompanying engraving represents a



pocket book or case for holding a knife, fork, scissors, spoon, plate, lint, bandages, and, in short, the numerous small articles necessary for a soldier's comfort, each provided with its special place where the hand can be laid upon it when it is wanted.

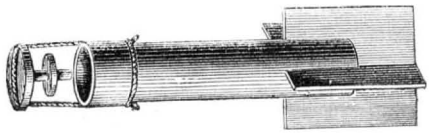
The case may be carried either in the knapsack or pocket, or suspended in front in the mode of a Highlander's sporran, which is said to be the easiest of all ways of carrying a moderate burden. It is made one leaf of leather and the other cloth, and its flat form renders it exceedingly compact.

Who of our pocket book manufacturers will get up some of these convenient articles, of good honest make, at a low price, for the use of our volunteers ? They will sell.

THE LADY'S WINGED GRENADE FOR HOUSE DEFENSE.

This little implement was invented by J. Norton, of England, who speaks of it as follows in a letter to the London *Mechanics' Magazine* :

This grenade, when thrown from an upper window



or the roof of a house, will always fallupon its bottom like a shuttle-cock. When charged, the percussion appliance hangs by its side attached by a slip of elastic twine. This appliance has a percussion cap in its center, and when the grenade is about to be used, the elastic twine permits the appliance to be placed on the nipple at the bottom of the grenade.

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